

EXHIBIT 2

Public Redacted Version--Conditionally Filed Under Seal

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA

TERADATA US, INC.,

Plaintiff,

and

TERADATA CORPORATION and
TERADATA OPERATIONS, INC.

Plaintiffs/Counterclaim-Defendants,

v.

SAP SE,

Defendant/Counterclaim-Plaintiff,

and

SAP AMERICA, INC. and SAP LABS, LLC,

Defendants.

EXPERT REPORT OF DR. GREGORY K. LEONARD

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I. QUALIFICATIONS

1. My name is Gregory K. Leonard. I am an economist and Vice President at Charles River Associates, 601 12th Street, Suite 1500, Oakland, CA 94607.

2. I received a Bachelor of Science in Applied Mathematics-Economics from Brown University in 1985 and a Ph.D. in Economics from the Massachusetts Institute of Technology in 1989. After receiving my Ph.D., I became an assistant professor at Columbia University. I subsequently moved into economic consulting and worked at several economic consulting firms prior to joining CRA.

3. My specialties within economics are applied microeconomics, the study of the behavior of consumers and firms, and econometrics, the application of statistical methods to economics data. I have published more than sixty articles in scholarly and professional publications, which are listed on my curriculum vitae, which is attached as Appendix A. Many of these articles address issues in industrial organization and the economics of intellectual property.

4. I am the Vice Chair for Economics of the Board of Editors of the *Antitrust Law Journal* and have served as a referee for numerous economics and other professional journals. I have given invited lectures on antitrust and intellectual property issues at the Federal Trade Commission (FTC), the United States Department of Justice (DOJ), the Directorate General for Competition of the European Commission, the Fair Trade Commission of Japan, and China's Supreme People's Court and Ministry of Commerce. I have been retained by the DOJ to consult on antitrust matters.

5. In 2009, I was invited to speak at a session of the FTC's hearings on the "Evolving IP Marketplace" concerning the calculation of patent damages. In the report that the FTC subsequently issued, my views on damages calculation were cited extensively. In 2007, I served

as a consultant to, and testified before, the Antitrust Modernization Commission, which was tasked by Congress and the President of the United States to make recommendations for revising U.S. antitrust laws. In its *Uniloc*¹ decision, the U.S. Court of Appeals for the Federal Circuit cited one of my publications in support of its conclusion that a method of calculating reasonable royalty damages in a patent case (the so-called “25% Rule”) is an unreliable and flawed methodology.

6. I have served as an expert witness in a number of litigation matters before U.S. District Courts, state courts, arbitration panels, and the U.S. International Trade Commission. A list of cases in which I have testified (in deposition or at trial) in the last five years is provided in Appendix A. My hourly rate for this matter is \$1,050.

II. OVERVIEW

7. On December 21, 2018, Teradata Corporation (“Teradata Corp”), Teradata US, Inc. (“Teradata US”), and Teradata Operations, Inc. (Teradata Ops”) filed their Second Amended Complaint alleging trade secret misappropriation, copyright infringement, and antitrust violations of the Sherman Act and Clayton Act against SAP SE (“SAP”), SAP America, Inc. (“SAP America”), and SAP Labs, LLC (“SAP Labs”).²

8. On July 10, 2019 SAP, SAP America, and SAP Labs filed their Amended Answer to the Second Amended Complaint and SAP filed its Counterclaims alleging patent infringement

¹ *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1317 (Fed. Cir. 2011).

² Second Amended Complaint for Trade Secret Misappropriation, Copyright Infringement, Violation of Sherman Act § 1, Violation of Clayton Act § 3, Violation of Sherman Act § 2; Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc., Plaintiffs, v. SAP SE, SAP America, Inc., and SAP Labs, LLC, Defendants; December 21, 2018 (“Teradata’s Second Amended Complaint”); pp. 28-31, 32-36.

against Teradata Corp and Teradata Ops.³ SAP's patent infringement counterclaims against Teradata originally involved the following five SAP patents: (1) U.S. Patent No. 9,626,421 ("the '421 patent"); (2) U.S. Patent No. 8,214,321 ("the '321 patent"); (3) U.S. Patent No. 7,421,437 ("the '437 patent"); (4) U.S. Patent No. 7,617,179 ("the '179 patent"); and (5) U.S. Patent No. 7,437,516 ("the '516 patent").⁴ I understand that according to SAP's Narrowed Set of Patent Claims filed on December 15, 2020 that the '516 patent is no longer being asserted in this matter.⁵ Therefore, SAP is now alleging patent infringement against Teradata for the '421, '321, '437, and '179 patents, which I refer to as the "SAP patents-in-suit" throughout this report.

9. I have been asked by counsel for SAP to analyze the damages allegedly sustained by SAP under the assumption that the asserted claims of the SAP patents-in-suit are valid, enforceable, and infringed by Teradata. The information I have considered in forming my opinions for this report is noted throughout the report and includes the materials listed in Appendix B.

III. SUMMARY OF OPINIONS

10. Based on the facts of this case and on the economic analysis discussed throughout this report, I have reached the following opinions.

- '421 Patent Damages
 - Comparable License Approach: My economic damages analysis based on the comparable JuxtaComm-SAP agreement results in lump-sum reasonable royalties for an April 2017 hypothetical license to the '421 patent of [REDACTED] for the damages period

³ Defendants' Amended Answer to the Second Amended Complaint; SAP SE's Counterclaims; Teradata US, Inc., Plaintiff, and Teradata Corporation and Teradata Operations, Inc., Plaintiffs/Counterclaim-Defendants, v. SAP SE, Defendant/Counterclaim-Plaintiff, and SAP America, Inc. and SAP Labs, LLC, Defendants; July 10, 2019 ("SAP's Amended Answer and Counterclaims"); pp. 34-63. For the purposes of this report, which pertains solely to the calculation of damages related to SAP SE's patent infringement counterclaims against Teradata Corp and Teradata Ops, I refer to Teradata Corp and Teradata Ops collectively as "Teradata". In circumstances where it is necessary to refer specifically to one of these Teradata entities, I identify them individually.

⁴ SAP's Amended Answer and Counterclaims, p. 28.

⁵ SAP SE's Narrowed Set of Patent Claims, December 15, 2020, p. 1.

from April 18, 2017 through November 2021 and [REDACTED] for the damages period from May 21, 2019 through November 2021.⁶

- Profit Apportionment Approach: My economic damages analysis based on the apportionment of the expected profits of the Teradata Accused Products to the claimed technologies of the '421 patent results in lump-sum reasonable royalties for an April 2017 hypothetical license to the '421 patent of [REDACTED] for the damages period from April 18, 2017 through November 2021 and [REDACTED] for the damages period from May 21, 2019 through November 2021.⁷
- '321 Patent Damages
 - Comparable License Approach: My economic damages analysis based on the comparable JuxtaComm-SAP agreement results in lump-sum reasonable royalties for a September 2014 hypothetical license to the '321 patent of [REDACTED] for the damages period from September 1, 2014 through November 2021 and [REDACTED] for the damages period from May 21, 2019 through November 2021.⁸
 - Profit Apportionment Approach: My economic damages analysis based on the apportionment of the expected profits of the Teradata Accused Products to the claimed technologies of the '321 patent results in lump-sum reasonable royalties for a September 2014 hypothetical license to the '321 patent of [REDACTED] for the damages period from September 1, 2014 through November 2021 and [REDACTED] for the damages period from May 21, 2019 through November 2021.⁹
- '437 Patent Damages
 - Profit Apportionment Approach: My economic damages analysis based on the apportionment of the expected profits of the Teradata Accused Products to the claimed technologies of the '437 patent results in lump-sum reasonable royalties for a May 2013 hypothetical license to the '437 patent of [REDACTED] to [REDACTED] for the damages period from July 10, 2013 through November 2021 and [REDACTED] to [REDACTED] for the damages period from May 21, 2019 through November 2021.¹⁰
- '179 Patent Damages
 - Profit Apportionment Approach: My economic damages analysis based on the apportionment of the expected profits of the Teradata Accused Products to the claimed technologies of the '179 patent results in lump-sum reasonable royalties for a May 2013 hypothetical license to the '179 patent of [REDACTED] to [REDACTED] for the damages

⁶ Exhibit 1a.

⁷ Exhibit 1a.

⁸ Exhibit 1a.

⁹ Exhibit 1a.

¹⁰ Exhibit 1a.

period from July 10, 2013 through November 2021 and [REDACTED] to [REDACTED] for the damages period from May 21, 2019 through November 2021.¹¹

IV. BACKGROUND

A. SAP

1. Relevant SAP Entities

11. SAP SE, referred to as SAP throughout this report, is a European company that serves as the global headquarters for SAP.¹² SAP SE is the assignee and sole owner of each of the SAP patents-in-suit.¹³

12. SAP was founded in 1972 and is a global leader in enterprise application software, defined as “computer software specifically developed to support and automate business processes,” and an experience management, analytics, and business company.¹⁴ SAP’s product portfolio encompasses three main areas: Experience, Intelligence, and Operations.

- Experience – “Experience Management (XM) refers both to the discipline of seeking out and closing the gaps found in the four core experiences of business – customer, product, employee, and brand – as well as technology.”¹⁵ The Qualtrics XM Platform, technology acquired by SAP in the 2019 acquisition of Qualtrics International, Inc., covers a portfolio of products including Qualtrics CoreXM, Qualtrics CustomerXM, Qualtrics EmployeeXM, Qualtrics ProductXM, and Qualtrics BrandXM.¹⁶
- Intelligence – “The Business Technology Platform was introduced in 2019. It provides solutions across four key technology areas: database and data management (SAP HANA); analytics (SAP Analytics Cloud); application development and integration (SAP Cloud Platform); and intelligent technologies (Internet of Things, machine learning, and blockchain) on an open cloud platform, running in SAP data centers and on selected

¹¹ Exhibit 1a.

¹² Teradata’s Second Amended Complaint, p. 2; SAP’s Amended Answer and Counterclaims, p. 5.

¹³ SAP’s Amended Answer and Counterclaims, p. 28.

¹⁴ SAP SE Form 20-F for the fiscal year ended December 31, 2019 (“SAP 2019 20-F”), p. 25.

¹⁵ SAP 2019 20-F, p. 30.

¹⁶ SAP 2019 20-F, p. 30.

hyperscalers. The platform’s business-centric technologies are designed to enable integration and innovation across the entire intelligent suite.”¹⁷ Below is a summary of key technology areas and related solutions:

- Database and Data Management: SAP HANA and Enterprise Information Management.¹⁸
- Analytics: SAP Analytics Cloud, SAP BusinessObjects Business Intelligence, SAP Data Warehouse Cloud, and SAP BW/4HANA.¹⁹
- Application Development and Integration: SAP Cloud Platform.²⁰
- Intelligence Technologies: SAP Leonardo Internet of Things, SAP Leonardo Artificial Intelligence, and SAP Leonardo Blockchain.²¹
- Operations – “Integrated with SAP S/4HANA and built on an open cloud platform to enable integration across heterogeneous environments, our operations offerings can connect to third-party applications and data. Following the acquisition of Qualtrics in 2019, we added Experience Management (XM) capabilities to our operations solutions.”²² Below is a summary of SAP’s operations offerings:
 - Customer: SAP C/4HANA and SAP S/4HANA.²³
 - Supply Chain: SAP Integrated Business Planning for Supply Chain.²⁴
 - Manufacturing: SAP Intelligent Asset Management.²⁵
 - Human Resources: SAP SuccessFactors.²⁶
 - Procurement: SAP Ariba, SAP Fieldglass, and SAP Concur.²⁷

13. In addition to SAP’s product portfolio, SAP also provides its customers maintenance and consulting services. “SAP provides an entire portfolio of services and support offerings designed

¹⁷ SAP 2019 20-F, p. 30.

¹⁸ SAP 2019 20-F, p. 30.

¹⁹ SAP 2019 20-F, pp. 30-31.

²⁰ SAP 2019 20-F, p. 31.

²¹ SAP 2019 20-F, p. 31.

²² SAP 2019 20-F, p. 31.

²³ SAP 2019 20-F, p. 31.

²⁴ SAP 2019 20-F, p. 32.

²⁵ SAP 2019 20-F, p. 32.

²⁶ SAP 2019 20-F, p. 32.

²⁷ SAP 2019 20-F, p. 32.

to help customers maximize the value of their SAP solutions in on-premise, cloud, and hybrid environments. In 2019, we continued a process that began in 2017 to simplify the SAP services and support portfolio and expand our range of intelligent tools to underpin services and support offerings for the intelligent enterprise, including XM services. This simplification established three portfolio categories to address customers' needs for as long as they use SAP software – premium success, project success, and continuous success.”²⁸

- Premium Success – “Our premium success services support large-scale transformation initiatives through a single, strategic, and customized on-site engagement. Our team of SAP experts help customers design, deploy, adopt, and operate SAP solutions on premise, hybrid, or in the cloud. The offerings differ based on size of customer and intensity of engagement.”²⁹
- Project Success – “Our project success services support the adoption of SAP products and technologies. These include services to help deliver a digital business strategy, preconfigured content for multiple industries or lines of business, best practices, methodologies, and tools. Further, these offerings also support the use of emerging technologies and the implementation of or transition to SAP S/4HANA.”³⁰
- Continuous Success – “Our continuous success services support our cloud solutions and on-premise software. We offer services to provide proactive, predictive, and preventive support across hybrid landscapes to help customers move to the cloud and make SAP S/4HANA their Intelligent ERP of choice as well as bundled customer success activities to accelerate cloud adoption.”³¹
- Intelligent Tools – In addition to the three portfolio categories, “[w]e also provide intelligent tools to help guide and deliver application management and administrative support for our service offerings.”³²

²⁸ SAP 2019 20-F, p. 32.

²⁹ SAP 2019 20-F, p. 32.

³⁰ SAP 2019 20-F, p. 32.

³¹ SAP 2019 20-F, p. 32.

³² SAP 2019 20-F, p. 32.

2. SAP Patents-In-Suit

a. The '421 Patent

14. The '421 patent was issued on April 18, 2017 from U.S. Patent Application No. 12/234,497, filed on September 19, 2008, and the assignee was Hasso-Plattner-Institut Fur Softwaresystemtechnik GmbH ("HPI").³³ I understand that the priority date for the '421 patent is September 21, 2007, the filing date of Provisional Application No. 60/994,893.³⁴ The '421 patent is titled, "ETL-less zero-redundancy system and method for reporting OLTP data," and is described in the Abstract to the patent as follows:

A system includes a relational database management system component and a column-oriented data processing component. The relational database system component stores database information in a row format. The column-oriented data processing component stores the database information in a column format. In response to a database update request, the relational database management system component updates the database information stored in the row format; the relational database management system component notifies the column-oriented data processing component of the database update request; and the column-oriented data processing component updates the database information stored in said column format. In response to a query request, the column-oriented data processing component generates a query response based on the database information stored in said column format. In this manner, the system is able to generate up-to-date reports without the need for extraction, translation and loading procedures.³⁵

I understand that the '421 patent is set to expire on October 9, 2030.³⁶

³³ U.S. Patent No. 9,626,421.

³⁴ Counterclaim-Plaintiff SAP SE's Disclosures Pursuant to Patent L.R. 3-1 and 3-2, August 19, 2019, Patent L.R. 3-1(f) Disclosures – Priority Dates, p. 6.

³⁵ U.S. Patent No. 9,626,421.

³⁶ U.S. Patent No. 9,626,421; "US9626421B2 – ETL-less zero-redundancy system and method for reporting OLTP data," Google Patents, March 27, 2021, <https://patents.google.com/patent/US9626421B2>.

15. I understand that on November 20, 2008 the inventors of the '421 patent assigned their rights in U.S. Patent Application No. 12/234,497, which eventually issued as the '421 patent, to HPI.³⁷ [REDACTED]

[REDACTED]⁴⁰ U.S. Patent Application No. 12/234,497 issued as the '421 patent on April 18, 2017.⁴¹ Finally, I understand that HPI assigned its rights to the '421 patent to SAP on May 8, 2019.⁴²

16. The asserted claims of the '421 patent include claims 1, 2, 3, 14, 16, 17, 19, and 20.⁴³ I understand that the claimed technology of the '421 patent generally relates to a “novel way to store data in row-format and column-format” for use in online transaction processing (“OLTP”)

³⁷ SAP SE's Patent L.R. 3-8 Damages Contentions, December 20, 2019, p. 9; U.S. Patent No. 9,626,421.

³⁸ TD13482247 at 248-249.

³⁹ SAP SE's Patent L.R. 3-8 Damages Contentions, December 20, 2019, p. 9; Deposition 30(b)(1) of Kevin Prey, February 9, 2021, pp. 26-31.

⁴⁰ SAP_36981833; Deposition 30(b)(1) of Kevin Prey, February 9, 2021, pp. 28-29.

⁴¹ U.S. Patent No. 9,626,421.

⁴² SAP_02681642; SAP SE's Patent L.R. 3-8 Damages Contentions, December 20, 2019, p. 9.

⁴³ SAP SE's Narrowed Set of Patent Claims, December 15, 2020, p. 1; Expert Report of Dr. David Maier In Support of SAP SE's Patent Infringement Claims, March 15, 2021 (“Maier Report”), ¶ 207.

and online analytical processing (“OLAP”), respectively.⁴⁴ The Teradata products accused of infringing the ’421 patent are Teradata Columnar (“TD Columnar”), Teradata Intelligent Memory (“TIM”), and Teradata Database Version 14.10 and higher (“Teradata Database”), which includes “Teradata Vantage and any other Teradata offering that includes the accused functionality from TD Database, including without limitation Teradata IntelliFlex, Teradata IntelliBase, Teradata Cloud or another cloud service, Teradata Hybrid Cloud or another hybrid cloud/on-premises system, or any other Teradata platform or service on which TD Database is installed and run” (when specifically addressing these additional Teradata Database products separately from Teradata Database Version 14.10 and higher, I refer to them collectively as the “Related Teradata Database Products”).⁴⁵ I understand that the ’421 patent’s accused functionality is “join index creation in combination with the Teradata Columnar feature of Teradata Database, as used, for example, to create a single-table join index from a base table, with data of the single-table join index stored in column format, and with identical data of the base table stored in row format.”⁴⁶

17. I understand that a benefit of the claimed technology of the ’421 patent is that “[i]n a hybrid system that supports both OLTP processing and OLAP processing, where the same data is stored in row format and in column format, it is important for the row format data and the column format data to be consistent, or synchronized. Thus, in the ’421 patent when the row-

⁴⁴ Maier Report, ¶ 183.

⁴⁵ Maier Report, ¶ 218, Appendix 1; Counterclaim-Plaintiff SAP SE’s Disclosures Pursuant to Patent L.R. 3-1 and 3-2, August 19, 2019, Patent L.R. 3-1(b) Disclosures – Infringing Instrumentalities, pp. 1-3; Defendants’ First Supplemental Responses and Objections to Plaintiffs’ Seventh Set of Interrogatories (No. 51), October 29, 2020, Response to Interrogatory No. 51, p. 7; Defendants’ Second Supplemental Responses and Objections to Plaintiffs’ Seventh Set of Interrogatories (No. 51), February 12, 2021, Response to Interrogatory No. 51, p. 7.

⁴⁶ Defendants’ Second Supplemental Responses and Objections to Plaintiffs’ Seventh Set of Interrogatories (No. 51), February 12, 2021, Response to Interrogatory No. 51, p. 7; Maier Report, ¶¶ 223-229.

format data is updated, the column-format data is also updated in the same database transaction. In particular, in the '421 patent, the row format data and column format data are kept synchronized, unlike a system using an ETL approach, where updates to the column-format data might lag behind updates to the row-format data.”⁴⁷ Teradata touts performance improvements resulting from this technology for certain workloads and queries;⁴⁸ [REDACTED]

[REDACTED]

[REDACTED]⁴⁹

b. The '321 Patent

18. The '321 patent was issued on July 3, 2012 from U.S. Patent Application No. 10/854,164, filed on May 27, 2004, and the assignee was SAP AG.⁵⁰ I understand that the priority date for the '321 patent is May 28, 2003, the filing date of EP 03012034.⁵¹ The '321 patent is titled, “Systems and methods for data processing,” and is described in the Abstract to the patent as follows:

Data processing methods and systems are provided. The data processing methods and systems may include providing a set of database tables in a data warehouse, each one of the database tables being assigned to an entity type and storing entities of its entity type, providing at least one application program for processing of classes of database tables, assigning at least one of the database tables to each one of the classes of database tables of the application program, and processing entities stored in the assigned database tables by the application program.⁵²

⁴⁷ Maier Report, ¶ 200.

⁴⁸ TD01921852 at 854; TD01923635 at 636; TD02175809 at 821; TD02218145 at 146; TD03532710 at 712; TD03637000 at 001; TD04145710 at 725.

⁴⁹ TD02175809 at 821.

⁵⁰ U.S. Patent No. 8,214,321.

⁵¹ Counterclaim-Plaintiff SAP SE’s Disclosures Pursuant to Patent L.R. 3-1 and 3-2, August 19, 2019, Patent L.R. 3-1(f) Disclosures – Priority Dates, p. 6.

⁵² U.S. Patent No. 8,214,321.

I understand that the '321 patent is set to expire on May 7, 2029.⁵³

19. I understand that on August 13, 2004 the inventor of the '321 patent assigned their rights in U.S. Patent Application No. 10/854,164, which eventually issued as the '321 patent on July 3, 2012, to SAP.⁵⁴

20. The asserted claims of the '321 patent include claims 1, 2, and 4.⁵⁵ I understand that the claimed technology of the '321 patent generally relates to “ways to organize the tables and cubes used in databases so that they can be more easily and efficiently recognized and accessed. At a high level this is done by assigning a table or cube to a particular class. These classes serve to group data structures storing related data, so an application can access the structures together.”⁵⁶ The Teradata products accused of infringing the '321 patent are all versions of Teradata Analytics for SAP Solutions (“TAS”) and Teradata Enterprise Analytics Solutions/Teradata Analytics for Enterprise Applications (“EAS”) used in combination with compatible versions of Teradata Database and business intelligence (“BI”) tools from Teradata or third parties.⁵⁷ [REDACTED]

[REDACTED]

[REDACTED]

⁵³ U.S. Patent No. 8,214,321; “US8214321B2 – Systems and methods for data reporting,” Google Patents, March 27, 2021, <https://patents.google.com/patent/US8214321B2>.

⁵⁴ SAP SE’s Patent L.R. 3-8 Damages Contentions, December 20, 2019, p. 9; U.S. Patent No. 8,214,321.

⁵⁵ SAP SE’s Narrowed Set of Patent Claims, December 15, 2020, p. 1; Maier Report, ¶ 389.

⁵⁶ Maier Report, ¶ 377.

⁵⁷ Maier Report, ¶ 400; Counterclaim-Plaintiff SAP SE’s Disclosures Pursuant to Patent L.R. 3-1 and 3-2, August 19, 2019, Patent L.R. 3-1(b) Disclosures – Infringing Instrumentalities, pp. 1-3; SAP SE’s Supplement to Patent L.R. 3-8 Damages Contentions, October 12, 2020, pp. 6-7; Defendants’ First Supplemental Responses and Objections to Plaintiffs’ Seventh Set of Interrogatories (No. 51), October 29, 2020, Response to Interrogatory No. 51, pp. 7-8; Defendants’ Second Supplemental Responses and Objections to Plaintiffs’ Seventh Set of Interrogatories (No. 51), February 12, 2021, Response to Interrogatory No. 51, pp. 7-8.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

21. I understand that a benefit of the claimed technology of the '321 patent is that it involves the organization of “tables and cubes used in databases so that they can be more easily and efficiently recognized and accessed.”⁶³ [REDACTED]

⁵⁸ Maier Report, ¶ 406.

⁵⁹ Maier Report, ¶ 407.

⁶⁰ Maier Report, ¶ 408.

⁶¹ Maier Report, ¶ 410.

⁶² Maier Report, ¶ 411.

⁶³ Maier Report, ¶ 377.

22. The '437 patent was issued on September 2, 2008 from U.S. Patent Application No. 10/704,924, filed on November 10, 2003, and the assignee was SAP AG.⁶⁵ I understand that the priority date for the '437 patent is November 10, 2003.⁶⁶ The '437 patent is titled, "System and method for a data dictionary cache in a distributed system," and is described in the Abstract to the patent as follows:

I understand that the '437 patent is set to expire on November 16, 2024.⁶⁸

⁶⁴ TD00588575 at 575-576; TD00629908 at 909.

⁶⁶ Counterclaim-Plaintiff SAP SE's Disclosures Pursuant to Patent L.R. 3-1 and 3-2, August 19, 2019, Patent L.R. 3-1(f) Disclosures – Priority Dates, p. 6.

⁶⁸ U.S. Patent No. 7,421,437; “US7421437B2 – Systems and method for data dictionary cache in a distributed system,” Google Patents, March 27, 2021, <https://patents.google.com/patent/US7421437B2>.

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24. The asserted claims of the '437 patent include claims 1, 3, 4, 5, 11, 12, 13, 14, and 15.⁷⁰ I understand that the claimed technology of the '437 patent generally relates to “storing data dictionary information in application-layer caches so that the data dictionary information can be accessed more quickly and efficiently.”⁷¹ The Teradata product accused of infringing the '437 patent is Teradata Database.⁷² [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]⁷³

25. I understand that a benefit of the claimed technology of the '437 patent is that “one or more data dictionary caches are provided within the application layer for storing frequently used system information from the data dictionary. Software in the application layer may receive, from a client, a request for system information. If one of the application layer’s data dictionary caches includes the requested system information, that information is (quickly) accessed in the data dictionary cache and provided back to the client. Otherwise, the requested system information is (more slowly) obtained from a data dictionary at the data access layer, put in a newly created data dictionary cache, and provided back to the client.”⁷⁴ The claimed technology is considered

⁷⁰ SAP SE’s Narrowed Set of Patent Claims, December 15, 2020, p. 1; Maier Report, ¶ 310.

⁷¹ Maier Report, ¶ 303.

⁷² Maier Report, ¶ 318; Counterclaim-Plaintiff SAP SE’s Disclosures Pursuant to Patent L.R. 3-1 and 3-2, August 19, 2019, Patent L.R. 3-1(b) Disclosures – Infringing Instrumentalities, pp. 1-3; SAP SE’s Supplement to Patent L.R. 3-8 Damages Contentions, October 12, 2020, p. 5; Defendants’ First Supplemental Responses and Objections to Plaintiffs’ Seventh Set of Interrogatories (No. 51), October 29, 2020, Response to Interrogatory No. 51, p. 8; Defendants’ Second Supplemental Responses and Objections to Plaintiffs’ Seventh Set of Interrogatories (No. 51), February 12, 2021, Response to Interrogatory No. 51, p. 8.

⁷³ Defendants’ Second Supplemental Responses and Objections to Plaintiffs’ Seventh Set of Interrogatories (No. 51), February 12, 2021, Response to Interrogatory No. 51, p. 8; Maier Report, ¶¶ 324-331.

⁷⁴ Maier Report, ¶ 309.

one of the “building blocks of parallelism in Teradata Database,”⁷⁵ essential to the system’s architecture; Teradata Database claims, among other benefits, improved performance with minimal overhead as a result of its parallelism.⁷⁶

d. The ’179 Patent

26. The ’179 patent was issued on November 10, 2009 from U.S. Patent Application No. 10/835,230, filed on April 28, 2004, and the assignee was iAnywhere Solutions, Inc.⁷⁷ I understand that the priority date for the ’179 patent is April 28, 2004.⁷⁸ The ’179 patent is titled, “System and methodology for cost-based subquery optimization using a left-deep tree join enumeration algorithm,” and is described in the Abstract to the patent as follows:

A system providing methodology for cost-based enumeration of subqueries using a left-deep tree join enumeration algorithm is described. In one embodiment, for example, in a database system, a method of the present invention is described for optimizing a database query, the method comprises steps of: receiving a database query including at least one subquery; building a query optimization graph for each query block of the database query, the query optimization graph including plan nodes representing subqueries of each query block; generating a set of access methods and join methods for each plan node, including generating at least one access method for a subquery quantifier based on subquery type and semantic properties of the database query; determining an optimal access plan for each query block based upon selecting access methods, join methods, and join order for plan nodes of the query optimization graph having favorable execution costs; and constructing a detailed access plan for execution of the database query based upon the optimal access plan determined for each query block.⁷⁹

⁷⁵ SAP_04691633 at 634-635.

⁷⁶ TD00558114 at 116.

⁷⁷ U.S. Patent No. 7,617,179.

⁷⁸ Counterclaim-Plaintiff SAP SE’s Disclosures Pursuant to Patent L.R. 3-1 and 3-2, August 19, 2019, Patent L.R. 3-1(f) Disclosures – Priority Dates, p. 6.

⁷⁹ U.S. Patent No. 7,617,179.

I understand that the '179 patent is set to expire on April 14, 2026.⁸⁰

27. I understand that on April 28, 2004 the inventor of the '179 patent assigned their rights in U.S. Patent Application No. 10/835,230, which eventually issued as the '179 patent, to Sybase, Inc. ("Sybase").⁸¹ I further understand that on December 11, 2008 Sybase assigned its rights in the same patent application to iAnywhere Solutions, Inc. ("iAnywhere").⁸² U.S. Patent Application No. 10/835,230 issued as the '179 patent on November 10, 2009.⁸³ In May 2010, I understand that SAP America, Inc. ("SAP America") acquired Sybase including the '179 patent, and in December 2015, Sybase merged with iAnywhere.⁸⁴ Finally, I understand that on April 29, 2019, Sybase (on behalf of iAnywhere) assigned its rights in the '179 patent to SAP.⁸⁵

28. The asserted claims of the '179 patent include claims 1, 6, 13, 16, 18, 22, and 23.⁸⁶ I understand that the claimed technology of the '179 patent generally relates to "finding optimal ways to execute queries within databases."⁸⁷ The Teradata product accused of infringing the '179 patent is Teradata Database.⁸⁸ I understand that the '179 patent's accused functionality is

⁸⁰ U.S. Patent No. 7,617,179; "US7617179B2 – Systems and methodology for cost-based subquery optimization using a left-deep tree join enumeration algorithm," Google Patents, March 27, 2021, <https://patents.google.com/patent/US7617179B2>.

⁸¹ SAP SE's Patent L.R. 3-8 Damages Contentions, December 20, 2019, p. 8.

⁸² SAP SE's Patent L.R. 3-8 Damages Contentions, December 20, 2019, p. 8.

⁸³ SAP SE's Patent L.R. 3-8 Damages Contentions, December 20, 2019, p. 8; U.S. Patent No. 7,617,179.

⁸⁴ SAP SE's Patent L.R. 3-8 Damages Contentions, December 20, 2019, p. 8.

⁸⁵ SAP SE's Patent L.R. 3-8 Damages Contentions, December 20, 2019, p. 8.

⁸⁶ SAP SE's Narrowed Set of Patent Claims, December 15, 2020, p. 1; Maier Report, ¶ 461.

⁸⁷ Maier Report, ¶ 427.

⁸⁸ Maier Report, ¶ 474; Counterclaim-Plaintiff SAP SE's Disclosures Pursuant to Patent L.R. 3-1 and 3-2, August 19, 2019, Patent L.R. 3-1(b) Disclosures – Infringing Instrumentalities, pp. 1-3; SAP SE's Supplement to Patent L.R. 3-8 Damages Contentions, October 12, 2020, pp. 5-6; Defendants' First Supplemental Responses and Objections to Plaintiffs' Seventh Set of Interrogatories (No. 51), October 29, 2020, Response to Interrogatory No. 51, pp. 8-9; Defendants' Second Supplemental Responses and Objections to Plaintiffs' Seventh Set of Interrogatories (No. 51), February 12, 2021, Response to Interrogatory No. 51, pp. 8-9.

“the ‘Incremental Planning and Execution’ feature of the Teradata Optimizer of Teradata Database.”⁸⁹ [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

29. [REDACTED]

[REDACTED]

⁸⁹ Defendants’ Second Supplemental Responses and Objections to Plaintiffs’ Seventh Set of Interrogatories (No. 51), February 12, 2021, Response to Interrogatory No. 51, p. 9.

⁹⁰ Maier Report, ¶ 489.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

3. SAP Patent-Practicing Products

30. I understand that SAP's products that incorporate some of the claimed technologies of the SAP patents-in-suit (referred to as "the SAP Patent-Practicing Products") include the following:

- SAP's HANA implements the technologies of certain claims of the '421 patent.⁹⁵ "SAP HANA is a column-oriented in-memory database that runs advanced analytics alongside high-speed transactions – in a single system...[HANA] lets companies process massive amounts of data with near zero latency, query data in an instant, and become truly data driven. By storing data in column-based tables in main memory and bringing online analytical processing (OLAP) and online transactional processing (OLTP) together, SAP HANA is unique – and significantly faster than other database management systems (DBMS) on the market today."⁹⁶

"In addition to acting as a database server, storing and retrieving data requested by applications, SAP HANA offers advanced search, analytics, and data integration capabilities for all types of data – structured and unstructured. It also functions as an application server and helps companies build smart, insight-driven applications based on real-time data, in-memory computing, and machine learning technology. These capabilities are available both in the cloud, and on-premise."⁹⁷

⁹¹ Maier Report, ¶ 491.

⁹² TD00500555 at 565.

⁹³ TD00500555 at 558.

⁹⁴ TD00500555 at 565, 572, 610, 613; TD00558114 at 120.

⁹⁵ Deposition 30(b)(6) of Franz Faerber, January 21, 2012, pp. 15-16; Deposition 30(b)(1) of Franz Faerber, January 21, 2021, pp. 12-15; U.S. Patent No. 9,626,421, col. 14:51-55, 19:34-51, 20:31-39.

⁹⁶ "What is SAP HANA?," at <https://www.sap.com/products/hana/what-is-sap-hana.html?btp=195ae8c5-1dbf-4918-9849-96d6114ff962#overview>.

⁹⁷ "What is SAP HANA?," at <https://www.sap.com/products/hana/what-is-sap-hana.html?btp=195ae8c5-1dbf-4918-9849-96d6114ff962#overview>.

- SAP's Business Warehouse ("BW") implements the technologies of certain claims of the '421 patent.⁹⁸ "In SAP BW, you can integrate, transform, and consolidate relevant business information from productive SAP applications and external data sources. SAP BW provides you with a high-performance infrastructure that helps you evaluate and interpret data. Decision makers can make well-founded decisions and identify target-orientated activities on the basis of the analyzed data."⁹⁹
- SAP's Business ByDesign implements the technologies of certain claims of the '421 patent.¹⁰⁰ SAP Business ByDesign is a "single cloud ERP solution for fast-growing, mid-market businesses to scale and compete without the complexity and cost."¹⁰¹ It connects every company function, including finance, customer relationship management, human resources, project management, procurement, and supply chain management, and provides industry-specific functionality.¹⁰²
- Sybase Adaptive Server R. Anywhere ("ASA") / SAP SQL Anywhere, Versions 9 and higher, implement the technologies of certain claims of the '179 patent.¹⁰³ SAP SQL Anywhere "[e]nable[s] secure, reliable data management for servers where no DBA is available and synchronization for tens of thousands of mobile devices, Internet of Things (IoT) systems, and remote environments."¹⁰⁴

B. Teradata

1. Relevant Teradata Entities

a. Teradata Corporation

31. Teradata Corporation, referred to as Teradata Corp throughout this report, is the global headquarters of Teradata, and through itself and subsidiaries conducts R&D, engineering, and

⁹⁸ Deposition 30(b)(6) of Franz Faerber, January 21, 2012, pp. 15-16; Deposition 30(b)(1) of Franz Faerber, January 21, 2021, pp. 12-15; U.S. Patent No. 9,626,421, col. 14:51-55, 19:34-51, 20:31-39.

⁹⁹ "SAP Business Warehouse," at https://help.sap.com/doc/saphelp_nw74/7.4.16/en-us/b2/e50138fed083de10000009b38f8cf/content.htm?no_cache=true.

¹⁰⁰ Deposition 30(b)(6) of Franz Faerber, January 21, 2012, pp. 15-16; Deposition 30(b)(1) of Franz Faerber, January 21, 2021, pp. 12-15; U.S. Patent No. 9,626,421, col. 14:51-55, 19:34-51.

¹⁰¹ "SAP Business ByDesign," at <https://www.sap.com/products/business-bydesign.html?btp=195ae8c5-1dbf-4918-9849-96d6114ff962>.

¹⁰² "SAP Business ByDesign Features," at <https://www.sap.com/products/business-bydesign/features.html?btp=195ae8c5-1dbf-4918-9849-96d6114ff962>.

¹⁰³ Counterclaim-Plaintiff SAP SE's Disclosures Pursuant to Patent L.R. 3-1 and 3-2, August 19, 2019, Patent L.R. 3-1(f) Disclosures – Priority Dates, p. 6; U.S. Patent No. 7,617,179, col. 11:61-63, 12:39-43.

¹⁰⁴ "SAP SQL Anywhere," at <https://www.sap.com/products/sql-anywhere.html?btp=195ae8c5-1dbf-4918-9849-96d6114ff962>.

other technical operations pertaining to Teradata's Enterprise Data Analytics and Warehousing ("EDAW") products.¹⁰⁵

32. Teradata was founded in 1979 and "is a leading hybrid cloud analytics software provider focused on helping companies leverage all of their data across an enterprise to uncover real-time intelligence, at scale."¹⁰⁶ Teradata has evolved "from an enterprise database company to an enterprise analytics platform provider helping our customers integrate and simplify their analytics ecosystem, access and manage data, and use analytics to extract answers and derive business value from data."¹⁰⁷ Teradata's business solution is focused around Teradata Vantage.

Our solution, Teradata Vantage™, is our data warehouse and analytics platform that allows companies to leverage all of their data across an enterprise, whether on premises, in public or private clouds, or in a hybrid environment. It connects multiple sources of data for ecosystem simplification and delivers massive scale and integration. Vantage is an extremely scalable, secure, highly concurrent and resilient analytics platform that addresses the challenges faced by our target market of the largest companies by offering full integration of their datasets, tools, analytics languages, functions, and engines in one platform, enabling them to reduce complexity, risk, and costs. Vantage incorporates leading commercial and open source technologies including our market-leading integrated data warehouse engine and analytic engines. Vantage is available in public and private clouds, as well as on-premises, providing our customers with flexibility and choice to de-risk their investments. Teradata has also made it easier for customers to work with the Company and purchase Teradata's solutions via subscription-based transactions.¹⁰⁸

Teradata's combined solution includes software, hardware, support and maintenance services, and business consulting services, which "include a broad range of offerings, including consulting to help organizations establish an analytic vision, identify and operationalize analytical

¹⁰⁵ Teradata's Second Amended Complaint, p. 2.

¹⁰⁶ Teradata Corporation Form 10-K for the fiscal year ended December 31, 2019 ("Teradata 2019 10-K"), pp. 4-5.

¹⁰⁷ Teradata 2019 10-K, p. 4.

¹⁰⁸ Teradata 2019 10-K, p. 5.

opportunities, enable an analytical ecosystem architecture, and ensure their analytical infrastructure delivers value.”¹⁰⁹

b. Teradata Operations, Inc.

33. Teradata Operations, Inc., referred to as Teradata Ops throughout this report, is a wholly-owned subsidiary of Teradata Corp and is responsible for Teradata’s business operations in the U.S., which includes product development and sales.¹¹⁰ I understand that “[s]ome employees of Teradata Operations, Inc. have used, sold, offered for sale, demonstrated, or assisted others in using Teradata Database at least once between May 21, 2019 and the date of this response.”¹¹¹

2. Teradata Accused Products

a. Teradata Products Accused of Infringing the Asserted Claims of the SAP Patents-In-Suit

34. Teradata’s products that are accused of infringing the asserted claims of the SAP patents-in-suit (referred to as the “Teradata Accused Products”) include the following:

- The ’421 Patent
 - Teradata Database: The accused versions of Teradata Database include Teradata Database Version 14.10, released in May 2013, and higher, which include Versions 15.0, 15.10, 16.00, 16.10, 16.20, 17.00, and 17.05.¹¹² Teradata Database is a “high-

¹⁰⁹ Teradata 2019 10-K, p. 5.

¹¹⁰ Teradata’s Second Amended Complaint, p. 2; Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.’s Responses to Defendants’ Seventh Set of Interrogatories (Nos. 50-53), February 11, 2021, Response to Interrogatory No. 51, p. 5.

¹¹¹ Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.’s Responses to Defendants’ Seventh Set of Interrogatories (Nos. 50-53), February 11, 2021, Response to Interrogatory No. 51, p. 5.

¹¹² Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.’s Responses to Defendants’ Fourth Set of Interrogatories (Nos. 29-41), April 6, 2020, Response to Interrogatory No. 36, p. 21; Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.’s Sixth Supplemental and Amended Responses to Defendants’ Fourth Set of Interrogatories (Nos. 30, 35-38, 40), February 12, 2021, First Supplemental and Amended Response to Interrogatory No. 36, pp. 12-13; Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.’s Eighth Supplemental and Amended Responses to Defendants’ Third Set of Interrogatories (Nos. 19, 21, 22, 23, 26, 27), February 12, 2021, First Supplemental and Amended Response to Interrogatory No. 19, p. 6.

performance decision-support engine, available in the widest array of deployment options, [that] offers you a full suite of data access and management tools, plus world-class services based on Teradata's years of data warehouse experience."¹¹³ "Teradata Database is designed for decision support and parallel implementation...[and] supports hundreds of installations, from three terabytes to huge warehouses with petabytes (PB) of data and thousands of users."¹¹⁴

- Related Teradata Database Products, which include other Teradata offerings that have the accused functionality from Teradata Database, include the following:
 - Teradata Vantage ("TD Vantage"): Teradata Database has evolved to become Teradata Vantage Advanced SQL Engine, referred to as TD Vantage. TD Vantage 1.0 was released in September 2018, and subsequent versions of Teradata Vantage include Versions 1.1, 1.3, 2.0, 2.1, and 2.2.¹¹⁵ TD Vantage is "a flexible analytic engine in a scalable, manageable database. Teradata Vantage enables businesses to obtain answers quickly as data volumes grow faster than ever before. Vantage uses available data to uncover real-time business intelligence at scale, allowing businesses to see data from across the entire organization in one place."¹¹⁶
 - Teradata IntelliFlex ("TD IntelliFlex"): TD IntelliFlex is "the purpose-built hardware platform for demanding data analytics" and "[d]esigned specifically for scalable enterprise analytics, Teradata IntelliFlex uses revolutionary MPP architecture and self-service software controls for independent scaling of processing power and data capacity."¹¹⁷ The TD IntelliFlex "hardware platform and Teradata Vantage, the platform for pervasive data intelligence— together compose a totally integrated, scalable solution to manage all the relevant data, all the time, and deliver analytics that matter. Vantage combines in a single platform descriptive, predictive,

¹¹³ "Teradata Database: High-Performance Analytics for Today's Business," at <https://assets.teradata.com/resourceCenter/downloads/Datasheets/EB9660.pdf>.

¹¹⁴ "Teradata Database: High-Performance Analytics for Today's Business," at <https://assets.teradata.com/resourceCenter/downloads/Datasheets/EB9660.pdf>.

¹¹⁵ Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Responses to Defendants' Fourth Set of Interrogatories (Nos. 29-41), April 6, 2020, Response to Interrogatory No. 36, p. 21; Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Sixth Supplemental and Amended Responses to Defendants' Fourth Set of Interrogatories (Nos. 30, 35-38, 40), February 12, 2021, First Supplemental and Amended Response to Interrogatory No. 36, pp. 12-13; Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Eighth Supplemental and Amended Responses to Defendants' Third Set of Interrogatories (Nos. 19, 21, 22, 23, 26, 27), February 12, 2021, First Supplemental and Amended Response to Interrogatory No. 19, p. 6.

¹¹⁶ Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Supplemental Responses to Defendants' Third Set of Interrogatories, April 24, 2020, Supplemental Response to Interrogatory No. 28, p. 8; Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Responses to Defendants' Fourth Set of Interrogatories (Nos. 29-41), April 6, 2020, Response to Interrogatory No. 36, p. 21; Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Sixth Supplemental and Amended Responses to Defendants' Fourth Set of Interrogatories, February 12, 2021, First Supplemental and Amended Response to Interrogatory No. 36, pp. 12-13.

¹¹⁷ "Teradata IntelliFlex," at <https://www.teradata.com/Products/Hardware/IntelliFlex>.

- prescriptive analytics, machine learning, and graph analytic functions; and IntelliFlex is the most powerful, scalable, and robust hardware platform for running Vantage.”¹¹⁸
- Teradata IntelliBase (“TD IntelliBase”): TD IntelliBase “is a compact environment for data warehousing and low-cost data storage” that “enables a mixture of Teradata and other application nodes to meet workload requirements – all installed into one cabinet to preserve valuable data center floor space.”¹¹⁹ TD IntelliBase capabilities include “[a] truly hybrid architecture that includes the Teradata SQL Engine, Hadoop, and Teradata IntelliSphere for a complete analytics solution in a data center-friendly single cabinet footprint, all running on proven, robust, enterprise-class Teradata hardware.”¹²⁰
 - Teradata Cloud (“TD Cloud”): TD Cloud is Teradata Database and Teradata Vantage provided as-a-service on Teradata hardware where “Teradata manages the performance, security, availability, and operations of customers’ analytics infrastructure. Internal teams can focus on answers, not IT. Teradata handles the details – software patches, version upgrades, performance reporting, and ticket resolution – so customers can manage their business.”¹²¹
 - Teradata IntelliCloud (“TD IntelliCloud”) and Teradata IntelliCloud – Vantage (“TD IntelliCloud Vantage”): TD IntelliCloud “builds on what was available with Teradata Managed Cloud and expands customers’ hybrid cloud options. The result is more choice, greater dexterity, and the ability for customers to increase their focus on extracting and applying analytic insights rather than on managing infrastructure.”¹²² TD IntelliCloud services include “[b]undled infrastructure services including platform deployment and management, onboarding assistance, backup and restore, system monitoring, upgrades and maintenance, enterprise-class security, and premier cloud support.”¹²³
 - TD Columnar: TD Columnar “is an enhancement that offers the ability to store the data in a table by column, instead of by row. In its simplest form, each column in the table becomes its own partition. The benefit of Columnar is faster execution time for queries that access a subset of a table’s columns, because less data will have to read from the database. Columnar can reduce the physical I/O required to read the table.”¹²⁴

¹¹⁸ “Teradata IntelliFlex™,” at <https://assets.teradata.com/resourceCenter/downloads/Datasheets/EB10002.pdf>.

¹¹⁹ “Teradata IntelliBase,” at <https://www.teradata.com/Products/Hardware/IntelliBase>.

¹²⁰ “Teradata IntelliBase™,” at https://assets.teradata.com/resourceCenter/downloads/Datasheets/EB10243_IntelliBase_2.0_11.5.2018.pdf.

¹²¹ “Teradata Vantage on Teradata Cloud,” at <https://www.teradata.com/Cloud/Teradata-Cloud>.

¹²² “Introducing Teradata IntelliCloud: Our Next Generation Managed Cloud,” at <https://www.teradata.com/Blogs/Introducing-Teradata-IntelliCloud-Our-Next-Generation-Managed-Cloud>.

¹²³ “Introducing Teradata IntelliCloud: Our Next Generation Managed Cloud,” at <https://www.teradata.com/Blogs/Introducing-Teradata-IntelliCloud-Our-Next-Generation-Managed-Cloud>.

¹²⁴ Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.’s Supplemental Responses to Defendants’ Third Set of Interrogatories, April 24, 2020, Supplemental Response to Interrogatory No. 28, pp.

- TIM: TIM “speeds data warehouse query performance and maximize the value of the system memory by ensuring that the most frequently used data is kept in memory. It is Teradata’s latest innovation in its comprehensive, system-level approach to multitemperature data management. Available on all members of the Teradata workload specific platform family, Teradata Intelligent Memory is the only memory technology that automatically and transparently puts the hottest, most frequently used data in memory.”¹²⁵
- I understand that Teradata infringes the asserted claims of the ’421 patent when installing or using any of the above accused software on Teradata’s customer’s computers, or via Teradata’s own computers (e.g., Teradata cloud server). I understand that Teradata also infringes when it sells or offers to sell the above accused software, even if the accused feature (e.g., TD Columnar) is not enabled at the time.
- I also understand that Teradata customers use the accused features and methods of the asserted claims of the ’421 patent, based in part on Teradata’s support, help, and recommendations.
- The ’321 Patent
 - Teradata Database
 - Related Teradata Database Products
 - TAS/EAS: The first accused version of TAS, Version 2.2.1, was released in September 2014, and subsequent accused versions of TAS include Versions 2.2.2, 2.2.3, 2.3, 2.4, 3.0, and 3.0.4 and TAS for Oracle EBS 4.0.¹²⁶ In 2017, TAS was renamed EAS.¹²⁷ The first accused version of EAS, EAS Server 1.00.00, was released in October 2016, and subsequent accused versions of EAS Server include Versions 1.0.1, 1.0.2, 1.0.3, 1.0.4, 1.0.5, and 1.0.6, and accused versions of EAS include Versions 4.1, 4.2, 4.3, 4.4, and 4.5.¹²⁸ TAS/EAS “offers customers a way to simplify the integration of data from

11-12; “Vantage: How to Enjoy Hybrid Partitioning with Teradata Columnar,” at <https://www.teradata.com/Blogs/How-to-Enjoy-Hybrid-Partitioning-with-Teradata-Columnar>.

¹²⁵ “Teradata Intelligent Memory” at <https://assets.teradata.com/resourceCenter/downloads/WhitePapers/EB7614.pdf.pdf>.

¹²⁶ Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.’s Responses to Defendants’ Fourth Set of Interrogatories (Nos. 29-41), April 6, 2020, Response to Interrogatory No. 36, pp. 21-22; Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.’s Sixth Supplemental and Amended Responses to Defendants’ Fourth Set of Interrogatories (Nos. 30, 35-38, 40), February 12, 2021, First Supplemental and Amended Response to Interrogatory No. 36, p. 13; Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.’s Eighth Supplemental and Amended Responses to Defendants’ Third Set of Interrogatories (Nos. 19, 21, 22, 23, 26, 27), February 12, 2021, First Supplemental and Amended Response to Interrogatory No. 19, p. 6.

¹²⁷ Plaintiff Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.’s Responses to Defendants’ Third Set of Requests for Admission (Nos. 269-841), February 12, 2021, Request for Admission No. 369, p. 34.

¹²⁸ Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.’s Responses to Defendants’ Fourth Set of Interrogatories (Nos. 29-41), April 6, 2020, Response to Interrogatory No. 36, p. 22; Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.’s Sixth Supplemental and Amended Responses to Defendants’ Fourth Set of Interrogatories (Nos. 30, 35-38, 40), February 12, 2021, First Supplemental and

enterprise applications into a Teradata Integrated Data Warehouse to facilitate reporting, business intelligence, and business analytics. As a pre-built packaged solution, EAS reconciles overlapping data to provide a single view of enterprise ERP data.”¹²⁹

- I understand that Teradata infringes the asserted claims of the ’321 patent when installing or using any of the above accused software on Teradata’s customer’s computers, or via Teradata’s own computers (e.g., Teradata cloud server). I understand that Teradata also infringes when it sells or offers to sell the above accused software, even if the accused functionality is not enabled at the time.
- I also understand that Teradata customers use the accused features and methods of the asserted claims of the ’321 patent, based in part on Teradata’s support, help, and recommendations.
- The ’437 Patent
 - Teradata Database
 - Related Teradata Database Products
 - I understand that Teradata infringes the asserted claims of the ’437 patent when installing or using any of the above accused software on Teradata’s customer’s computers, or via Teradata’s own computers (e.g., Teradata cloud server). I understand that Teradata also infringes when it sells or offers to sell the above accused software, even if the accused functionality is not enabled at the time.
 - I also understand that Teradata customers use the accused features and methods of the asserted claims of the ’437 patent, based in part on Teradata’s support, help, and recommendations.
- The ’179 Patent
 - Teradata Database
 - Related Teradata Database Products
 - I understand that Teradata infringes the asserted claims of the ’179 patent when installing or using any of the above accused software on Teradata’s customer’s computers, or via Teradata’s own computers (e.g., Teradata cloud server). I understand that Teradata also infringes when it sells or offers to sell the above accused software, even if the accused functionality is not enabled at the time.
 - I also understand that Teradata customers use the accused features and methods of the asserted claims of the ’179 patent, based in part on Teradata’s support, help, and recommendations.

Amended Response to Interrogatory No. 36, pp. 13-14; Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.’s Eight Supplemental and Amended Responses to Defendants’ Third Set of Interrogatories (Nos. 19, 21, 22, 23, 26, 27), February 12, 2021, First Supplemental and Amended Response to Interrogatory No. 19, p. 6.

¹²⁹ Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.’s Supplemental Responses to Defendants’ Third Set of Interrogatories, April 24, 2020, Supplemental Response to Interrogatory No. 28, p. 9.

35. Table 1 summarizes for each SAP patent-in-suit (i) the Teradata Accused Products accused of infringing the patent, (ii) the date of first infringement, and (iii) the damages periods.

Table 1: Summary of the Teradata Accused Products, Date of First Infringement, and Damages Periods for the SAP Patents-In-Suit

Patent	Teradata Accused Products	Date of First Infringement	Damages Periods	
			Description	Date Range
'421	Teradata Database Related Teradata Database Products TD Columnar TIM	April 18, 2017	Directly infringed method claims only	April 18, 2017 ¹³⁰ – Trial
			Indirectly infringed claims that do not require marking	May 21, 2019 ¹³¹ – Trial
			Directly infringed apparatus claims that do not comply with the marking statute	May 21, 2019 ¹³² – Trial
'321	Teradata Database Related Teradata Database Products TAS/EAS	September 1, 2014	Directly infringed claims that do not require marking	September 1, 2014 ¹³³ – Trial
			Indirectly infringed claims that do not require	May 21, 2019 ¹³⁴ – Trial

¹³⁰ SAP filed its patent counterclaims on July 10, 2019. See SAP's Amended Answer and Counterclaims. I understand that SAP can claim damages for six years before the July 10, 2019 filing date for claims that did not require marking. However, the date of first infringement for the '421 patent is on April 18, 2017 when the '421 patent was issued; therefore, the damages period begins on April 18, 2017.

¹³¹ I understand that SAP gave notice of its patent counterclaims on May 21, 2019. See Teradata's Responses to Defendants' Third Set of Interrogatories (Nos. 19-28), December 3, 2019, Response to Interrogatory No. 20, p. 5. I understand that SAP can claim damages starting on the May 21, 2019 notice date for indirectly infringed claims.

¹³² I understand that SAP gave notice of its patent counterclaims on May 21, 2019. See Teradata's Responses to Defendants' Third Set of Interrogatories (Nos. 19-28), December 3, 2019, Response to Interrogatory No. 20, p. 5. I understand that SAP can claim damages starting on the May 21, 2019 notice date for claims that do not comply with the marking statute.

¹³³ SAP filed its patent counterclaims on July 10, 2019. See SAP's Amended Answer and Counterclaims. I understand that SAP can claim damages for six years before the July 10, 2019 filing date for claims that did not require marking. However, the date of first infringement for the '321 patent is in September 2014 when the first accused version of TAS, Version 2.2.1, was released; therefore, the damages period begins on September 1, 2014.

Patent	Teradata Accused Products	Date of First Infringement	Damages Periods	
			Description	Date Range
			marking	
'437	Teradata Database Related Teradata Database Products	May 1, 2013	Directly infringed claims that do not require marking	July 10, 2013 ¹³⁵ – Trial
			Indirectly infringed claims that do not require marking	May 21, 2019 ¹³⁶ – Trial
'179	Teradata Database Related Teradata Database Products	May 1, 2013	Directly infringed method claims only	July 10, 2013 ¹³⁷ – Trial
			Indirectly infringed claims that do not require marking	May 21, 2019 ¹³⁸ – Trial
			Directly infringed apparatus claims that do not comply with the marking statute	May 21, 2019 ¹³⁹ – Trial

¹³⁴ I understand that SAP gave notice of its patent counterclaims on May 21, 2019. See Teradata's Responses to Defendants' Third Set of Interrogatories (Nos. 19-28), December 3, 2019, Response to Interrogatory No. 20, p. 5. I understand that SAP can claim damages starting on the May 21, 2019 notice date for indirectly infringed claims.

¹³⁵ SAP filed its patent counterclaims on July 10, 2019. See SAP's Amended Answer and Counterclaims. I understand that SAP can claim damages for six years before the July 10, 2019 filing date for claims that did not require marking. The '437 patent issued on September 2, 2008; therefore, the damages period begins on July 10, 2013, which is six years before the July 10, 2019 filing date.

¹³⁶ I understand that SAP gave notice of its patent counterclaims on May 21, 2019. See Teradata's Responses to Defendants' Third Set of Interrogatories (Nos. 19-28), December 3, 2019, Response to Interrogatory No. 20, p. 5. I understand that SAP can claim damages starting on the May 21, 2019 notice date for indirectly infringed claims.

¹³⁷ SAP filed its patent counterclaims on July 10, 2019. See SAP's Amended Answer and Counterclaims. I understand that SAP can claim damages for six years before the July 10, 2019 filing date for claims that did not require marking. The '179 patent issued on November 10, 2009; therefore, the damages period begins on July 10, 2013, which is six years before the July 10, 2019 filing date.

¹³⁸ I understand that SAP gave notice of its patent counterclaims on May 21, 2019. See Teradata's Responses to Defendants' Third Set of Interrogatories (Nos. 19-28), December 3, 2019, Response to Interrogatory No. 20, p. 5. I understand that SAP can claim damages starting on the May 21, 2019 notice date for indirectly infringed claims.

¹³⁹ I understand that SAP gave notice of its patent counterclaims on May 21, 2019. See Teradata's Responses to Defendants' Third Set of Interrogatories (Nos. 19-28), December 3, 2019, Response to Interrogatory No. 20, p. 5. I understand that SAP can claim damages starting on the May 21, 2019 notice date for claims that do not comply with the marking statute.

b. Teradata Accused Products Revenues and Profits

36.

[illegible][illegible]

140

[illegible]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

¹⁴¹ Letter from James R. Hancock to Joshua L. Fuchs, dated February 25, 2021, re “Letter dated February 19, 2021,” (“February 25, 2021 letter from James R. Hancock to Joshua L. Fuchs”) answer to Question 36, pp. 5-6.

¹⁴² February 25, 2021 letter from James R. Hancock to Joshua L. Fuchs, answer to Question 35, pp. 4-5.

¹⁴³ February 25, 2021 letter from James R. Hancock to Joshua L. Fuchs, answer to Question 1f), p. 3.

¹⁴⁴ Letter from James R. Hancock to Joshua L. Fuchs, dated February 9, 2021, re “Letter dated January 25, 2021 and email dated February 3, 2021,” (“February 9, 2021 letter from James R. Hancock to Joshua L. Fuchs”) answer to Question 14, p. 6.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

37. Total revenue for the Teradata Accused Products accused of infringing the '421 patent from April 18, 2017 through Q3 2020 were [REDACTED]¹⁴⁶ Total revenue for the Teradata Accused Products accused of infringing the '321 patent from September 1, 2014 through Q3 2020 were [REDACTED]¹⁴⁷ Total revenue for the Teradata Accused Products accused of infringing the '437 patent from July 10, 2013 through Q3 2020 were [REDACTED]¹⁴⁸ Total revenue for the Teradata Accused Products accused of infringing the '179 patent from July 10,

¹⁴⁵ Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Sixth Supplemental and Amended Responses to Defendants' Fourth Set of Interrogatories, February 12, 2021, First Supplemental and Amended Response to Interrogatory No. 36, p. 13; Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Eighth Supplemental and Amended Responses to Defendants' Third Set of Interrogatories (Nos. 19, 21, 22, 23, 26, 27), February 12, 2021, First Supplemental and Amended Response to Interrogatory No. 19, p. 6.

¹⁴⁶ Exhibit 6a. Total revenue for the Teradata Accused Products accused of infringing the '421 patent from May 21, 2019 through Q3 2020 were [REDACTED]. See Exhibit 6a.

¹⁴⁷ Exhibit 6a. Total revenue for the Teradata Accused Products accused of infringing the '321 patent from May 21, 2019 through Q3 2020 were [REDACTED]. See Exhibit 6a.

¹⁴⁸ Exhibit 6a. Total revenue for the Teradata Accused Products accused of infringing the '437 patent from May 21, 2019 through Q3 2020 were [REDACTED]. See Exhibit 6a.

[REDACTED]

[REDACTED]

I use these Estimated TD Columnar revenues to calculate damages for Damages Scenario 1.¹⁵⁴

39. After calculating the accused revenue for the Teradata Accused Products, I calculated the local cost of revenue, standard margin, corporate cost of revenue, gross profit, operating expenses, and operating profit for these products [REDACTED]

[REDACTED]

[REDACTED].¹⁵⁵ My calculation of the costs and profits associated with the Teradata Accused Products relies on the following methodology:

[REDACTED]

[REDACTED]

¹⁵³ Exhibit 7c. For the period from May 21, 2019 through Q3 2020 total estimated TD Columnar revenues are [REDACTED]. See Exhibit 7c.

¹⁵⁴ See Exhibit 7c for my calculation of Estimated TD Columnar revenues for Damages Scenario 2.

¹⁵⁵ [REDACTED]

¹⁵⁶ [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

157 [REDACTED]

158 [REDACTED]

159 [REDACTED]

Total operating profit for the Teradata Accused Products accused of infringing the '421 patent from April 18, 2017 through Q3 2020 was [REDACTED]¹⁶⁰ Total operating profit for the Teradata Accused Products accused of infringing the '321 patent from September 1, 2014 through Q3 2020 was [REDACTED]¹⁶¹ Total operating profit for the Teradata Accused Products accused of infringing the '437 patent from July 10, 2013 through Q3 2020 was [REDACTED]¹⁶² Total operating profit for the Teradata Accused Products accused of infringing the '179 patent from July 10, 2013 through Q3 2020 was [REDACTED]¹⁶³ I use these accused operating profits to calculate damages for Damages Scenario 1.¹⁶⁴

c. Expected Teradata Accused Products Revenues and Profits

40. [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] As a result, I

¹⁶⁰ Exhibits 6a and 6b. Total operating profit for the Teradata Accused Products accused of infringing the '421 patent from May 21, 2019 through Q3 2020 was [REDACTED] See Exhibits 6a and 6b.

¹⁶¹ Exhibits 6a and 6b. Total operating profit for the Teradata Accused Products accused of infringing the '321 patent from May 21, 2019 through Q3 2020 was [REDACTED] See Exhibits 6a and 6b.

¹⁶² Exhibits 6a and 6b. Total operating profit for the Teradata Accused Products accused of infringing the '437 patent from May 21, 2019 through Q3 2020 was [REDACTED] See Exhibits 6a and 6b.

¹⁶³ Exhibits 6a and 6b. Total operating profit for the Teradata Accused Products accused of infringing the '179 patent from May 21, 2019 through Q3 2020 was [REDACTED] See Exhibits 6a and 6b.

¹⁶⁴ See Exhibits 6d and 6e for my calculation of accused operating profits for the Teradata Accused Products for Damages Scenario 2.

¹⁶⁵ Deposition 30(b)(6) of Peter Wetzel, February 26, 2021, pp. 44-45.

have constructed the expected revenues and profits for the Teradata Accused Products as of the May 2013, September 2014, and April 2017 dates of first infringement to use in my calculation of damages under both my Comparable License Approach and Profit Apportionment Approach described in detail below.

41. To construct the expected revenues and profits for the Teradata Accused Products as of the May 2013 date of first infringement for the '437 and '179 patents, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

166 [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

167 Exhibit 8a.

168 Exhibit 5a. [REDACTED]

[REDACTED]

[REDACTED] See Exhibit 8b.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

170 Exhibit 5a. [REDACTED]
[REDACTED]
See Exhibit 8b.

¹⁷² Exhibit 5a. [REDACTED]
[REDACTED]
[REDACTED] See Exhibit 8c.

173 Exhibit 8a.

[illegible]

175 [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

178 Exhibit 8a.

[REDACTED]

44. I use these expected accused revenues, operating profit margins, and operating profits to calculate damages for Damages Scenario 1.¹⁸⁰

V. OVERVIEW OF THE ECONOMIC DAMAGES FRAMEWORK

45. I understand that damages in patent infringement cases are governed by 35 U.S.C. § 284, which states: “Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement but in no event less than a reasonable royalty for the use made of the invention by the infringer...” If the infringement has caused the patent owner to lose profits, and these lost profits exceed the reasonable royalty, I understand that the patent owner is entitled to recover the lost profits. In some cases, the damages may combine the lost profits associated with a portion of the infringing sales that caused those lost profits, and a reasonable royalty on the remainder of the infringing sales.

46. I understand that SAP is not claiming lost profits due to Teradata’s alleged infringement of the SAP patents-in-suit¹⁸¹ and, therefore, my damages analysis in this report focuses exclusively on the calculation of reasonable royalty damages resulting from Teradata’s alleged infringement of the SAP patents-in-suit. A reasonable royalty is calculated on the defendant’s infringing sales, and I understand that the reasonable royalty may, though does not necessarily

¹⁷⁹ Exhibit 5a.

¹⁸⁰ See Exhibit 5d, 5e, and 5f for my calculation of expected accused revenues, operating profit margins, and operating profits for the Teradata Accused Products for Damages Scenario 2.

¹⁸¹ SAP SE’s Patent L.R. 3-8 Damages Contentions, December 20, 2019, p. 4.

have to, be analyzed using what are known as the *Georgia-Pacific* factors.¹⁸² A given factor may not be relevant in a given case and other information beyond the factors may be relevant for determining the reasonable royalty.

47. In my view as an economist, a reasonable royalty for the SAP patents-in-suit is one that is consistent with the royalty that the patent owner (SAP) and alleged infringer (Teradata) would have negotiated at or before the date of Teradata's first alleged infringement of the SAP patents-in-suit. Additionally, from the perspective of an economist, a reasonable royalty should reflect the inherent value of the claimed inventions of the SAP patents-in-suit and should not incorporate value created by other technologies, assets, or economic factors. A reasonable royalty focused on the inherent value of the claimed inventions of the SAP patents-in-suit provides a return to the patent owner that, in turn, creates the appropriate incentives to innovate. Either undercompensating or overcompensating a patent owner creates an incentive that leads to economically inefficient market outcomes that ultimately harm economic welfare.

48. The economist's view of a reasonable royalty as articulated above is consistent with the views of the Federal Circuit. The Federal Circuit has stated that the reasonable royalty should be "carefully" tied to the "claimed invention's footprint in the marketplace."¹⁸³ That is to say, the reasonable royalty should reflect only the value that the alleged invention creates for the defendant or the patent owner, not value created by other economic factors. The Federal Circuit has referred to this concept as "apportionment": "the royalty rate for [patents] must be

¹⁸² *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970).

¹⁸³ *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1317 (Fed. Cir. 2011) (citing *ResQNet.com, Inc. v. Lansa, Inc.*, 594 F.3d, 869 (Fed. Cir. 2010)).

apportioned to the value of the patented invention.”¹⁸⁴ Thus, particularly in the context of multi-component products such as the Teradata Accused Products, apportionment is required as a legal matter to isolate the component to which the patented technology contributed.¹⁸⁵ Furthermore, sound economic analysis recognizes the economic reality that many factors contribute to the revenue and market success associated with an overall product or process. Those factors include, among other things, features covered by other patents, non-patented features, other intellectual property (e.g., trade secrets), components and processes, reliability, brand reputation, marketing, sales efforts, and manufacturing quality and capability.¹⁸⁶

49. To an economist, a useful way to determine the reasonable royalty is to analyze the outcome of a hypothetical licensing negotiation between the parties prior to first infringement. Such an analysis is also contemplated under *Georgia-Pacific* Factor 15. In analyzing the outcome of the hypothetical negotiation, it may be necessary to consider various economic factors, many of which relate to the remaining *Georgia-Pacific* factors. For example, comparable market transactions, including licenses and acquisitions (and corresponding valuations) involving the patents-in-suit (which are considered under *Georgia-Pacific* Factor 1)

¹⁸⁴ *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1232 (Fed. Cir. 2014). See also *Virnetx, Inc. v. Cisco Sys., Inc.*, 767 F.3d 1308, 1326 (Fed. Cir. 2014) (citing *Garretson v. Clark*, 111 U.S. 120, 121 (1884)) (“the patentee.. must in every case give evidence tending to separate or apportion the defendant’s profits and the patentee’s damages between the patented feature and the unpatented features”).

¹⁸⁵ *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 68 (Fed Cir. 2012) (“Admission of...overall revenues, which have no demonstrated correlation to the value of the patented feature alone, only serve to make a patentee’s proffered damages amount appear modest by comparison, and to artificially inflate the jury’s damages calculation beyond that which is adequate to compensate for the infringement.”) (internal quotations omitted).

¹⁸⁶ Use of the smallest salable unit as a starting point for the royalty base analysis itself reflects an attempt at apportionment to exclude non-accused components, though further apportionment may be necessary. *LaserDynamics*, 694 F.3d at 67-68 (holding that a proper royalty base must apportion out features beyond the implicated optical disk drive component). See also *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1324 (Fed. Cir. 2009) (finding that, although Microsoft Outlook was the smallest salable unit, its multiple features required the plaintiff to apportion the value of the accused “date picker” function)); *AVM Techs., LLC v. Intel*

and comparable patented technologies (which are considered under *Georgia-Pacific* Factors 2 and 12), can provide useful information regarding the outcome of the hypothetical negotiation and thus the appropriate reasonable royalty. Additionally, apportioning for non-accused technologies that are incorporated into the accused products, which is considered under *Georgia-Pacific* Factor 13 (and under *Georgia-Pacific* Factors 1, 2, and 12 when, for example, there is a comparable license involving the patent-in-suit or comparable patented technologies that already accounts for apportionment of non-accused technologies), ensures that the appropriate reasonable royalty is focused on the value of the invention of the patent-in-suit and, thus, does not either overstate or understate this value. Furthermore, the availability of acceptable non-infringing alternatives to the patents-in-suit, including any design-arounds, which are considered under *Georgia-Pacific* Factors 9, 10, and 11, is important information to consider when determining the incremental value of the patented technology and, thus, the appropriate reasonable royalty.

VI. REASONABLE ROYALTY DAMAGES ANALYSIS

A. Hypothetical Negotiations for a Non-Exclusive License to the SAP Patents-in-Suit

50. *Georgia-Pacific* Factor 15 contemplates the outcome of a hypothetical negotiation between SAP and Teradata for a non-exclusive license to the SAP patents-in-suit.

51. As a legal matter, I understand that the hypothetical negotiation must be assumed to have occurred at a date on or before the date of Teradata's first alleged infringement of the SAP patents-in-suit. I understand that the date of first infringement of the '437 and '179 patents

Corp., No. 10-610-RGA, 2013 WL 126233, at **2-3 (D. Del. Jan. 4, 2013) (holding that even the smallest salable unit must be apportioned).

would have been in May 2013, the release date of the accused Teradata Database Version 14.10.¹⁸⁷ I understand that the date of first infringement of the '321 patent would have been in September 2014, the release date of the accused TAS Version 2.2.1.¹⁸⁸ Finally, I understand that the date of first infringement of the '421 patent would have been on April 18, 2017, the issue date of the '421 patent.¹⁸⁹ As a result, I have been asked to assume that the date of the hypothetical negotiation for the '437 and '179 patents would have been in May 2013; the date of the hypothetical negotiation for the '321 patent would have been in September 2014; and the date of the hypothetical negotiation for the '421 patent would have been in April 2017.

52. At the hypothetical negotiation taking place in May 2013, SAP, as the owner of the '437 and '179 patents, would have been the party negotiating as the licensor. Teradata would have been the party negotiating as the licensee. At the hypothetical negotiation taking place in September 2014, SAP, as the owner of the '321 patent, would have been the party negotiating as the licensor. Teradata would have been the party negotiating as the licensee. Finally, at the time of the hypothetical negotiation taking place in April 2017, SAP, as owner of the '421 patent, would have been the party negotiating as the licensor. Teradata would have been the party negotiating as the licensee.

53. Under the hypothetical negotiation construct, SAP must be assumed to have been a willing licensor and Teradata must be assumed to have been a willing licensee. I further understand that, during the hypothetical negotiation, the parties must be assumed to have

¹⁸⁷ SAP SE's Supplement to Patent L.R. 3-8 Damages Contentions, October 12, 2020, pp. 5-6.

¹⁸⁸ SAP SE's Supplement to Patent L.R. 3-8 Damages Contentions, October 12, 2020, pp. 6-7.

¹⁸⁹ SAP SE's Supplement to Patent L.R. 3-8 Damages Contentions, October 12, 2020, p. 6.

understood that the asserted claims of the SAP patents-in-suit were valid, enforceable, and infringed.

54. In the following sections of this report, I analyze the relevant economic evidence that informs the reasonable royalty analysis for the SAP patents-in-suit under the hypothetical negotiation construct. My analysis of the relevant economic evidence for determining a reasonable royalty is consistent with a *Georgia-Pacific* factor analysis.¹⁹⁰ Therefore, after analyzing this economic evidence in detail, I then address each of the fifteen *Georgia-Pacific* factors (many of which correspond directly to the relevant economic evidence) to determine the final reasonable royalty.

B. SAP Agreements Involving Licenses to Patents – *Georgia-Pacific* Factor 12

55. *Georgia-Pacific* Factor 12 considers, among other things, agreements entered by SAP in which it has granted licenses or received licenses to patents other than the SAP patents-in-suit. Before using a license as a comparable for determining the outcome of the hypothetical negotiation, one must assess whether the economic circumstances surrounding the license are sufficiently comparable to those surrounding the hypothetical negotiation and, if not, whether adjustments can be made to account for any significant dissimilarities. If the economic circumstances are not comparable and reliable adjustments cannot be made, then the license should not be used as a comparable.¹⁹¹

¹⁹⁰ *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970).

¹⁹¹ I note that when using a license or other transaction as a benchmark for the outcome of the hypothetical negotiation, it is not necessary that the license or other transaction was entered into prior to the hypothetical negotiation. In a benchmark analysis, it is not being posited that the parties to the hypothetical negotiation were aware of, and affected by, the benchmark license. Rather, it is being posited that the economic circumstances surrounding the benchmark license were similar to the economic circumstances surrounding the hypothetical negotiation (or that adjustments could be made to account for any significant differences). This can be the case whether the benchmark license was entered into before or after the date of the hypothetical negotiation. For

56. I have reviewed the SAP agreements produced in this matter that have involved, among other things, SAP granting or receiving licenses to patents other than the SAP patents-in-suit. A summary of the relevant terms and conditions of these SAP agreements is provided in Exhibit 10a. Based on the opinions of SAP's technical expert, Professor Wolfson, I understand that the July 31, 2009 Patent License and Settlement Agreement between JuxtaComm Technologies, Inc., ("JuxtaComm") and SAP AG (referred to as "SAP" in this agreement), Business Objects SA, and Business Objects Americas, Inc. (collectively, referred to as "Business Objects" in the agreement) ("JuxtaComm-SAP agreement") is an agreement that includes a license to a patent that is technically comparable to the '421 and '321 patents.¹⁹² Additionally, the July 14, 2019 Patent Sale and Grant-Back License Agreement and Confidential Patent Springing Rights Agreement between ServiceNow, Inc. ("ServiceNow") and SAP SE (referred to as "SAP" in the context of these agreements) (collectively, these agreements are referred to as the "SAP-ServiceNow agreements") are agreements that support my reasonable royalty analysis for a hypothetical license to the SAP patents-in-suit. Below I discuss the relevant terms and conditions of the JuxtaComm-SAP agreement and SAP-ServiceNow agreements, and the economic analysis that I performed to use these agreements to benchmark the appropriate reasonable royalty for a license to the SAP patents-in-suit.

example, if a license had been signed after the date of the hypothetical negotiation, but no significant changes in economic circumstances had occurred in the interim, the license would be a useful benchmark for the outcome of the hypothetical negotiation (assuming it met the other criteria of comparability).

¹⁹² Expert Report of Ouri Wolfson, Ph.D., March 29, 2021 ("Wolfson Report"), Section VII.B.

1. July 31, 2009 JuxtaComm-SAP Agreement

a. Terms and Conditions

[illegible]

¹⁹³ SAP_02684682 at 701, 710. I note that SAP is the parent company of both Business Objects entities, Business Objects SA and Business Objects Americas, Inc. (SAP 02684682-710 at 682).

¹⁹⁴ SAP 02684682 at 682.

¹⁹⁵ SAP_02684682 at 689-691.

¹⁹⁶ SAP 02684682 at 687.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

¹⁹⁷ SAP_02684682 at 684.

¹⁹⁸ SAP_02684682 at 684-685.

¹⁹⁹ SAP_02684682 at 684.

²⁰⁰ SAP_02684682 at 683-685.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

b. Economic Analysis

59. The JuxtaComm-SAP agreement is comparable to the hypothetical license between SAP and Teradata for several reasons. [REDACTED]

[REDACTED]

[REDACTED]. More specifically, I understand according to SAP's technical expert, Professor Wolfson, that the '662 patent and '321 patent cover comparable technology because "[b]oth the '321 patent and the '662 patent relate to software, data processing, and computer-implemented databases. More specifically, both patents relate to the manipulation of data for use in data management systems, such as data warehouses. Both the '321 and '662 patents claim improvements to processes for manipulating data so that further processing can be performed on the data. Both patents also describe the option of user-created definitions. Both patents use metadata for organizing or

²⁰¹ SAP_02684682 at 685.

²⁰² SAP_02684682 at 684.

²⁰³ SAP_02684682 at 688.

classification.”²⁰⁵ I further understand that the ’662 patent and ’421 patent cover comparable technology because “[b]oth the ’662 patent and ’421 patent relate to software, data processing, and computer-implemented databases. More specifically, both patents relate to the manipulation of data for use in data management systems, such as data warehouses. Both patents claim processes for manipulating data into different formats such that further processing can be performed on the data. Additionally, both patents provide an option of user-customization.”²⁰⁶ Finally, I understand that while the ’321 and ’421 patented technologies are each technically comparable to the ’662 patented technology, both the ’321 and ’421 patented technologies are more technically valuable than the ’662 patented technology “in the context of software products for manipulating data” including Business Objects Data Integrator and Teradata’s TAS/EAS and TD Columnar.²⁰⁷ Regarding the ’321 patent, “while the invention of the ’662 patent taught only an improvement to ETL processes known at the time of the invention, the invention taught in the ’321 patent extends beyond ETL and teaches how data can be further classified, mapped, and organized after ETL.”²⁰⁸ Regarding the ’421 patent, “[t]he invention in the ’662 patent mainly seeks to improve the range of databases that can work within an ETL process and to a lesser degree improve the performance of the ETL process by reducing resources required. While this would have value, the value would be mostly associated with the ability to build and reuse ETL processes with a broader range of databases. The invention in the ’421 patent seeks to provide a new capability for a company who would be running the system described in the patent and

²⁰⁴ SAP_02684682 at 691.

²⁰⁵ Wolfson Report, ¶ 172.

²⁰⁶ Wolfson Report, ¶ 183.

²⁰⁷ Wolfson Report, ¶¶ 173, 184.

²⁰⁸ Wolfson Report, ¶ 173.

avoid ETL processes and redundancies from the ETL procedure. Specifically, the '421 patent can be used to provide up-to-date analysis which would not be possible under a traditional ETL system where updates only occurred periodically.”²⁰⁹

60. [REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED].²¹⁰ “Data Integrator was a data integration and ETL tool offered by Business Objects at the time, which allowed customers to extract, transform, and deliver data from one database to another, so that processing for business intelligence and other data analytics purposes could be performed.”²¹¹ The Teradata Accused Products consist of, among others, TAS/EAS and TD Columnar. According to Professor Wolfson, “TAS/EAS is similar in some respects to Data Integrator, as Data Integrator and TAS/EAS contain ETL functionality allowing users to extract, transform, and load data from one source to another source, including manipulating that data for further processing in the second source. Users of TAS/EAS in conjunction with the Teradata Database are able to manipulate data, such as by organizing it and mapping it to allow for improved processing within the Teradata Database.”²¹² Additionally, according to Professor Wolfson, “Teradata Columnar allows users to manipulate data for improved processing for business intelligence and data analytics purposes to be performed on column-based views of data

²⁰⁹ Wolfson Report, ¶ 184.

²¹⁰ SAP_03201345; SAP_43550525; SAP_43550578.

²¹¹ Wolfson Report, ¶ 164.

from row-based databases without time-constraining input/output procedures. Teradata Columnar is similar in some respects to Data Integrator, which was a data integration and ETL tool that allowed customers to extract, transform, and deliver data from one database to another, so that processing for business intelligence and other data analytics purposes could be performed.”²¹³

61. Fourth, SAP [REDACTED] and is one of the parties to the hypothetical license. Fifth, and relatedly, SAP and Teradata [REDACTED], are both companies operating as suppliers of database technologies in the same overall industry.

62. After establishing the comparability between the JuxtaComm-SAP agreement and the SAP-Teradata hypothetical license, I conclude that this agreement can be used as a benchmark for the outcome of the hypothetical negotiation between SAP and Teradata for a license to the ’421 and ’321 patents. [REDACTED]

[REDACTED]. I refer to this approach to calculating the reasonable royalty for a hypothetical license to the ’421 and ’321 patents as the Comparable License Approach.

63. [REDACTED]

²¹² Wolfson Report, ¶ 171.

²¹³ Wolfson Report, ¶ 182.

²¹⁴ SAP_43550525.

[illegible]

²¹⁵ SAP_43550525 at 526.

²¹⁶ SAP_43550525 at 526.

64. My first economic adjustment accounts for the technical value of the '421 and '321 patents relative to the technical value of JuxtaComm's '662 patent. As discussed above, I understand according to SAP's technical expert, Professor Wolfson, that SAP's '421 and '321 patents are more technically valuable than JuxtaComm's '662 patent "in the context of software products for manipulating data" including Business Objects Data Integrator and Teradata's TAS/EAS and TD Columnar.²²⁰ Based on this technical understanding, and to be conservative for this technical value adjustment, I have assumed that SAP's '421 and '321 patents each claim technology that is as valuable technically as JuxtaComm's '662 patent in the context of data manipulation products. [REDACTED]

65. My second economic adjustment

²¹⁷ SAP 43550525 at 526-527.

²¹⁸ See Exhibits 4a and 4b for Damages Scenarios 1 and 2, respectively.

²¹⁹ SAP 43550525 at 527.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

220 [REDACTED]

221 [REDACTED]

222 [REDACTED]

223 [REDACTED]

- [REDACTED]

66. My third economic adjustment accounts for the assumptions of validity and infringement of the SAP patents-in-suit. I understand that the reasonable royalty analysis (and thus the analysis of the SAP-Teradata hypothetical license) requires the assumption that each of the SAP patents-in-suit are valid and infringed by Teradata. In contrast, under the JuxtaComm-SAP agreement [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Studies in the literature suggest a 30% to 55%

²²⁴ SAP 43550459 at 459. See also SAP 43550583 at 583, where SAP states:

probability of plaintiffs prevailing in patent cases.²²⁵ To implement this adjustment, I used 55%, the most conservative data point, for the '421 and '321 patents. This figure is particularly conservative given the important fact of this case, which is that the '662 patent was later invalidated, suggesting that the '662 patent had a lower than average (ex ante) probability of being found valid.

67. The results of my adjustments to the [REDACTED] [REDACTED] under the Comparable License Approach are the lump-sum reasonable royalties for the '421 and '321 patents presented in Table 2.

Table 2: Lump-Sum Reasonable Royalties for the '421 and '321 Patents—Comparable License Approach—Damages Scenario 1²²⁶

Patent	Damages Periods	
	Date Range	Lump-Sum Reasonable Royalty
'421 ²²⁷	April 18, 2017 – November 2021	[REDACTED]
	May 21, 2019 – November 2021	[REDACTED]
'321	September 1, 2014 – November 2021	[REDACTED]

²²⁵ In 1998, a study examining the validity of U.S. patents from 1989-1996 found that Federal Circuit and district courts held 54% of the patents to be valid. This was corroborated by other studies, which found that approximately 55% of the patents litigated in courts were found to be valid since the creation of the Federal Circuit, before which only about 35% of litigated patents were held valid on average. See John R. Allison and Mark Lemley, "Empirical Evidence on the Validity of Litigated Patents," American Intellectual Property Law Association (AIPLA) Quarterly Journal, Vol. 26 (1998), pp. 6, 16-17. Other studies have also concluded that verdicts in favor of plaintiffs, which are used as proxy for verdicts in favor of patent holders, range between 45-55.8%. See Edward F. Sherry and David J. Teece, "Royalties, evolving patent rights, and the value of innovation," Research Policy, Vol. 33 (2004), p. 187. Moreover, a 2017 study of federal district court cases in 2008-2009 found that operating companies, as opposed to non-practicing entities, won definitive rulings, i.e., the patent owner received a favorable final judgment on all infringement and validity issues in the case, 30.6% of the time. See John R. Allison, Mark A. Lemley and David L. Schwartz, "How Often Do Non-Practicing Entities Win Patent Suits?," Berkeley Technology Law Journal, Vol. 32 (2017), pp. 243, 266.

²²⁶ Exhibit 2a. See Exhibit 2b for my calculation of lump-sum reasonable royalties for the '421 and '321 patents under the Comparable License Approach for Damages Scenario 2.

²²⁷ In my calculation of damages for Teradata's infringement of the '421 patent I conservatively do not include damages associated with the '421 patent accused product, TIM. I note that according to Wayne Boyle of Teradata, "TIM was a very important technology to implement on a Teradata database" and "there was a great deal of use of TIM in the customer database." Deposition of Wayne Boyle, February 25, 2021, pp. 103-104.

Patent	Damages Periods	
	Date Range	Lump-Sum Reasonable Royalty
	May 21, 2019 – November 2021	

2. June 14, 2019 SAP-ServiceNow Agreements

a. Terms and Conditions

68. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

²²⁸ SAP_02684751 at 751, 754-757.

²²⁹ SAP_02684751 at 754.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

²³⁰ SAP_02684751 at 753.

²³¹ SAP_02684751 at 751, 766.

²³² SAP_02684751 at 752.

²³³ SAP_02684751 at 760.

²³⁴ SAP_02684751 at 756.

○

[REDACTED]

■

[REDACTED]

■

[REDACTED]

[REDACTED]

[REDACTED]

■

[REDACTED]

■

[REDACTED]

²³⁵ SAP_02684751 at 752.

²³⁶ SAP_02684751 at 751.

²³⁷ SAP_02684778 at 778.

²³⁸ SAP_02684778 at 779.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

b. Economic Analysis

71. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

²³⁹ SAP_02684778 at 779.

²⁴⁰ SAP_02684778 at 786.

²⁴¹ SAP_02684778 at 779.

²⁴² SAP_02684778 at 778, 780.

²⁴³ SAP_47962609; SAP_47962610; SAP-00006740; SAP_47962622 at 622.

²⁴⁴ SAP_47962612 at 612; SAP-00006742; SAP_47962615 at 615; SAP-00006744.

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Specifically, the opinions of Professor Wolfson indicate that SAP's '421 and '321 patents are technically comparable to JuxtaComm's '662 patent and, furthermore, that the '421 and '321 patents would be at least as valuable as the '662 patent, and likely more valuable.²⁴⁹ Under my Comparable License Approach based on the JuxtaComm-SAP agreement, my starting point for the reasonable royalty for the '421 and '321 patents is

²⁴⁵ SAP 47962615 at 615; SAP-00006744.

²⁴⁶ Deposition 30(b)(1) of Kevin Prey, February 9, 2021, pp. 46-47.

²⁴⁷ Deposition 30(b)(1) of Kevin Prey, February 9, 2021, pp. 56-57.

²⁴⁸ Deposition 30(b)(1) of Kevin Prey, February 9, 2021, pp. 55-56.

²⁴⁹ Wolfson Report, Section VII.B.

C. Apportionment of the Incremental Profits of the Teradata Accused Products to the Claimed Technologies of the SAP Patents-In-Suit – *Georgia-Pacific* Factors 8 and 13

1. Overview

73. For the purposes of analyzing *Georgia-Pacific* Factor 8, the economically appropriate measure of commercial success and profitability of the Teradata Accused Products to consider is the expected incremental revenues and profits that could be earned by using the patented technologies at the time of the hypothetical negotiation.²⁵⁰ Furthermore, *Georgia-Pacific* Factor 13 requires non-patented factors, including the contributions of Teradata, to be considered when analyzing the expected incremental revenues and profits of the Teradata Accused Products.²⁵¹ For the purposes of accounting for *Georgia-Pacific* Factor 13 in the context of the hypothetical negotiation between SAP and Teradata for a license to the SAP patents-in-suit, the parties can be assumed to have given Teradata appropriate credit for its contributions to the Teradata Accused Products. This apportionment is important to ensure that the resulting reasonable royalty reflects the contribution of the patented invention, i.e., its “footprint in the marketplace,” rather than the contribution of other factors that were unrelated to the patented invention. All else equal, where the alleged infringer has made significant contributions to the success of the accused products, the negotiated royalty would be lower than if the licensee had made no such contribution.

²⁵⁰ *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970).

²⁵¹ *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970).

74. So that the resulting reasonable royalty “reflect[s] the value attributable to the infringing features of the product and no more,”²⁵² one approach to addressing apportionment and the commercial success and profitability of the accused products is to apportion the expected incremental profits of the Teradata Accused Product to the claimed technologies of the SAP patents-in-suit. Such an approach to calculating the reasonable royalty for a hypothetical license to the SAP patents-in-suit, which I refer to as the Profit Apportionment Approach, combines the specific considerations under *Georgia-Pacific* Factors 8 and 13 (along with the considerations under other *Georgia-Pacific* factors) and results in an upper bound for the outcome of the hypothetical negotiation. The necessary steps required to apportion the expected incremental profits of the Teradata Accused Products to the value of the claimed technologies of the SAP patents-in-suit, and to determine the resulting reasonable royalty, are as follows:

- Apportionment of the expected revenues of the Teradata Accused Products to the claimed technologies of the SAP patents-in-suit.
- Calculation of the expected incremental profits for the apportioned revenues.
- Split of the apportioned expected incremental profits between SAP and Teradata.

2. Calculation of the Expected Incremental Profits for the Revenues of the Teradata Accused Products Apportioned to the Claimed Technologies of the SAP Patents-In-Suit

a. The '421 Patent

75. I understand that the accused functionality covered by the claimed technology of the '421 patent is incorporated in the TD Columnar feature of Teradata Database. The first step in my apportionment analysis for the '421 patent is to apportion the expected revenues of the Teradata Accused Products accused of infringing the '421 patent to TD Columnar. Based on the approach

²⁵² *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1226 (Fed. Cir. 2014).

for calculating the expected accused revenues for the Teradata Accused Products described in Section IV.B.2.c, including my approach for estimating TD Columnar revenues that are embedded in the revenues from sales of versions of Teradata Database where TD Columnar is bundled with these products and not priced separately, I calculated [REDACTED] in net present value terms as of the April 2017 hypothetical negotiation, in expected TD Columnar revenues from April 18, 2017 through November 2021.²⁵³

76. The second step in my apportionment analysis for the '421 patent is to apportion these expected TD Columnar revenues to the claimed technology of the '421 patent. According to Professor Wolfson's technical analysis I understand that the apportionment factor for the '421 patent ranges from 12.5% to 33.3% of TD Columnar revenues.²⁵⁴ Applying the range of '421 patented technology apportionment factors of 12.5% to 33.3% to the net present value of the total expected TD Columnar revenues from April 18, 2017 through November 2021 results in a net present value of the total expected Teradata Accused Products revenues apportioned to the claimed technology of the '421 patent of [REDACTED].²⁵⁵

77. The final step in my apportionment analysis for the '421 patent is to calculate the net present value of the incremental profits for the expected TD Columnar revenues apportioned to the claimed technology of the '421 patent. I used the expected operating profit margins that I calculated for TD Columnar based on the approach described in Section IV.B.2.c. Applying the

²⁵³ Exhibit 3c. I calculated [REDACTED] in net present value terms as of the April 2017 hypothetical negotiation, in expected TD Columnar revenues from May 21, 2019 through November 2021. See Exhibit 3c.

²⁵⁴ Wolfson Report, ¶ 73.

²⁵⁵ Exhibit 3a. Applying the range of '421 patented technology apportionment factors of 12.5% to 33.3% to the net present value of the total expected TD Columnar revenues from May 21, 2019 through November 2021 results in a net present value of the total expected Teradata Accused Products revenues apportioned to the claimed technology of the '421 patent of [REDACTED]. See Exhibit 3a.

expected TD Columnar operating profit margins to the net present value of the expected TD Columnar revenues apportioned to the claimed technology of the '421 patent results in a net present value of the total expected Teradata Accused Products profits apportioned to the claimed technology of the '421 patent of [REDACTED] from April 18, 2017 through November 2021.²⁵⁶

b. The '321 Patent

78. I understand that the accused functionality covered by the claimed technology of the '321 patent is incorporated in the TAS/EAS feature of Teradata Database. The first step in my apportionment analysis for the '321 patent is to apportion the revenues of the Teradata Accused Products accused of infringing the '321 patent to TAS/EAS. Based on the approach for calculating the expected accused revenues for the Teradata Accused Products described in Section IV.B.2.c, I calculated [REDACTED] in net present value terms as of the September 2014 hypothetical negotiation, in expected TAS/EAS revenues from September 1, 2014 through November 2021.²⁵⁷

79. The second step in my apportionment analysis for the '321 patent is to apportion these expected TAS/EAS revenues to the claimed technology of the '321 patent. I have not been asked to address apportionment for the accused TAS/EAS revenues associated with Teradata's infringement of the '321 patent and, accordingly, have not done so. As a result, I have been

²⁵⁶ Exhibit 3a. Applying the expected TD Columnar operating profit margins to the net present value of the expected TD Columnar revenues apportioned to the claimed technology of the '421 patent results in a total net present value of the expected Teradata Accused Products profits apportioned to the claimed technology of the '421 patent of [REDACTED] from May 21, 2019 through November 2021. See Exhibit 3a.

²⁵⁷ Exhibit 4a. I calculated [REDACTED] in net present value terms as of the September 2014 hypothetical negotiation, in expected TAS/EAS revenues from May 21, 2019 through November 2021. See Exhibit 4a. [REDACTED]
[REDACTED]
[REDACTED]

asked to assume that the apportionment factor for the '321 patent is 100% of TAS/EAS revenues. Applying the '321 patented technology apportionment factor of 100% to the net present value of the total expected TAS/EAS revenues from September 1, 2014 through November 2021 results in a net present value of the total expected Teradata Accused Products revenues apportioned to the claimed technology of the '321 patent of [REDACTED]²⁵⁸

80. The final step in my apportionment analysis for the '321 patent is to calculate the net present value of the incremental profits for the expected TAS/EAS revenues apportioned to the claimed technology of the '321 patent. I used the expected operating profit margins that I calculated for TAS/EAS based on the approach described in Section IV.B.2.c. Applying the expected TAS/EAS operating profit margins to the net present value of the expected TAS/EAS revenues apportioned to the claimed technology of the '321 patent results in a net present value of the total expected Teradata Accused Products profits apportioned to the claimed technology of the '321 patent of [REDACTED] from September 1, 2014 through November 2021.²⁵⁹

c. The '437 Patent

81. The first step in my apportionment analysis for the '437 patent is to apportion the expected accused revenues for Teradata Database to the claimed technology of the '437 patent. Based on the approach for calculating the expected accused revenues for the Teradata Accused Products described in Section IV.B.2.c, I calculated [REDACTED] in net present value terms as of

²⁵⁸ Exhibit 3a. Applying the '321 patented technology apportionment factor of 100% to the total net present value of the expected TAS/EAS revenues from May 21, 2019 through November 2021 results in total expected Teradata Accused Products revenues apportioned to the claimed technology of the '321 patent of [REDACTED] See Exhibit 3a.

²⁵⁹ Exhibit 3a. Applying the expected TAS/EAS operating profit margins to the net present value of the expected TAS/EAS revenues apportioned to the claimed technology of the '321 patent results in a total net present value of the expected Teradata Accused Products profits apportioned to the claimed technology of the '321 patent of [REDACTED] from May 21, 2019 through November 2021. See Exhibit 3a.

the May 2013 hypothetical negotiation, in expected Teradata Database revenues from July 10, 2013 through November 2021.²⁶⁰ According to Professor Wolfson's technical analysis I understand that the apportionment factor for the '437 patent ranges from 0.05% to 0.225% of Teradata Database revenues.²⁶¹ Applying the range of '437 patented technology apportionment factors of 0.05% to 0.225% to the net present value of the total expected Teradata Database revenues from July 10, 2013 through November 2021 results in a net present value of the total expected Teradata Accused Products revenues apportioned to the claimed technology of the '437 patent of [REDACTED].²⁶²

82. The second step in my apportionment analysis for the '437 patent is to calculate the net present value of the incremental profits for the expected Teradata Database revenues apportioned to the claimed technology of the '437 patent. I used the expected operating profit margins that I calculated for Teradata Database based on the approach described in Section IV.B.2.c. Applying the expected Teradata Database operating profit margins to the net present value of the total expected Teradata Database revenues apportioned to the claimed technology of the '437 patent results in a net present value of the total expected Teradata Accused Products profits apportioned to the claimed technology of the '437 patent of [REDACTED] from July 10, 2013 through November 2021.²⁶³

²⁶⁰ Exhibit 4a. I calculated [REDACTED] in net present value terms as of the May 2013 hypothetical negotiation, in expected Teradata Database revenues from May 21, 2019 through November 2021. See Exhibit 4a.

²⁶¹ Wolfson Report, ¶ 149.

²⁶² Exhibit 3a. Applying the range of '437 patented technology apportionment factors of 0.05% to 0.225% to the net present value of the total expected Teradata Database revenues from May 21, 2019 through November 2021 results in the net present value of the total expected Teradata Accused Products revenues apportioned to the claimed technology of the '437 patent of [REDACTED]. See Exhibit 3a.

²⁶³ Exhibit 3a. Applying the expected Teradata Database operating profit margins to the net present value of the expected Teradata Database revenues apportioned to the claimed technology of the '437 patent results in a total

d. The '179 Patent

83. The first step in my apportionment analysis for the '179 patent is to apportion the expected accused revenues for Teradata Database to the claimed technology of the '179 patent. Based on the approach for calculating the expected accused revenues for the Teradata Accused Products described in Section IV.B.2.c, I calculated [REDACTED] in net present value terms as of the May 2013 hypothetical negotiation, in expected Teradata Database revenues from July 10, 2013 through November 2021.²⁶⁴ According to Professor Wolfson's technical analysis I understand that the apportionment factor for the '179 patent ranges from 1% to 2.25% of Teradata Database revenues.²⁶⁵ Applying the range of '179 patented technology apportionment factors of 1% to 2.25% to the net present value of the total expected Teradata Database revenues from July 10, 2013 through November 2021 results in the net present value of the total expected Teradata Accused Products revenues apportioned to the claimed technology of the '179 patent of [REDACTED].²⁶⁶

84. The second step in my apportionment analysis for the '179 patent is to calculate the net present value of the incremental profits for the expected Teradata Database revenues apportioned to the claimed technology of the '179 patent. I used the expected operating profit margins that I calculated for Teradata Database based on the approach described in Section IV.B.2.c. Applying the expected Teradata Database operating profit margins to the net present value of the expected

net present value of the expected Teradata Accused Products profits apportioned to the claimed technology of the '437 patent of [REDACTED] from May 21, 2019 through November 2021. See Exhibit 3a.

²⁶⁴ Exhibit 4a. I calculated [REDACTED] in net present value terms as of the May 2013 hypothetical negotiation, in expected Teradata Database revenues from May 21, 2019 through November 2021. See Exhibit 4a.

²⁶⁵ Wolfson Report, ¶ 127.

²⁶⁶ Exhibit 3a. Applying the range of '179 patented technology apportionment factors of 1% to 2.25% to the net present value of the total expected Teradata Database revenues from May 21, 2019 through November 2021

Teradata Database revenues apportioned to the claimed technology of the '179 patent results in a net present value of the total expected Teradata Accused Products profits apportioned to the claimed technology of the '179 patent of [REDACTED] from July 10, 2013 through November 2021.²⁶⁷

3. Split of the Apportioned Incremental Profits

85. SAP and Teradata would have negotiated over a split of the expected Teradata Accused Product profits apportioned to the claimed technologies of the SAP patents-in-suit.

86. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

results in the net present value of the total expected Teradata Accused Products revenues apportioned to the claimed technology of the '179 patent of [REDACTED] See Exhibit 3a.

²⁶⁷ Exhibit 3a. Applying the expected Teradata Database operating profit margins to the net present value of the expected Teradata Database revenues apportioned to the claimed technology of the '179 patent results in a total net present value of the expected Teradata Accused Products profits apportioned to the claimed technology of the '179 patent of [REDACTED] from May 21, 2019 through November 2021. See Exhibit 3a.

²⁶⁸ [REDACTED]

²⁶⁹ [REDACTED]

²⁷⁰ TD00048499 at 510. The economics bargaining literature shows that the split of the “pie” that the parties are bargaining over, i.e., the gains to trade, will depend on the parties’ relative costs of extending the negotiation to get a better deal. A measure of a party’s costs of waiting is the rate at which it discounts future expected cash flows (the party’s discount rate). See, e.g., A. Rubinstein, “Perfect Equilibrium in a Bargaining Model,” *Econometrica*, 1982. A company’s WACC is a useful approximation of its discount rate. Using SAP’s and Teradata’s WACCs around the time of the May 2013 hypothetical negotiation of 8.7% and 11.3%, respectively, I have calculated a split of approximately 56% going to SAP and 44% going to Teradata. Using SAP’s and Teradata’s WACCs around the time of the September 2014 hypothetical negotiation of 9.6% and 11.6%, respectively, I have calculated a split of approximately 55% going to SAP and 45% going to Teradata. Using

[REDACTED]

87. Applying [REDACTED] to the expected Teradata Accused Products profits apportioned to the claimed technologies of the SAP patents-in-suit results in the portion of these profits that Teradata would pay to SAP for a license to the SAP patents-in-suit. The results of my analysis under the Profit Apportionment Approach are the lump-sum reasonable royalties for each of the SAP patents-in-suit presented in Table 3.

SAP's and Teradata's WACCs around the time of the April 2017 hypothetical negotiation of 7.0% and 10.6%, respectively, I have calculated a split of approximately 60% going to SAP and 40% going to Teradata. Bloomberg Terminal, March 3, 2021. [REDACTED]

²⁷¹ Teradata Corporation Form 10-K for the fiscal year ended December 31, 2013 ("Teradata 2013 10-K"), p. 19 ("Our operating expense budgets (including such categories as headcount, real estate, and technology resources) are based on projected annual and quarterly revenue levels and are generally incurred ratably throughout each quarter. Since our operating expenses are relatively fixed in the short term, failure to generate projected revenues for a specified period could adversely impact our operating results, reducing net income or causing an operating loss for that period."). See also Teradata Corporation Form 10-K for the fiscal year ended December 31, 2014 ("Teradata 2014 10-K"), pp. 17-18; Teradata Corporation Form 10-K for the fiscal year ended December 31, 2017 ("Teradata 2017 10-K"), p. 19.

²⁷² SAP AG Form 20-F for the fiscal year ended December 31, 2013 ("SAP 2013 20-F"), p. F-3; SAP SE Form 20-F for the fiscal year ended December 31, 2014 ("SAP 2014 20-F"), p. F-3; SAP SE Form 20-F for the fiscal year ended December 31, 2017 ("SAP 2017 20-F"), p. F-4; Teradata 2013 10-K, p. 49; Teradata 2014 10-K, p. 42; Teradata 2017 10-K, p. 42.

Table 3: Lump-Sum Reasonable Royalties for the SAP Patents-in-Suit—Profit Apportionment Approach—Damages Scenario 1²⁷³

Patent	Damages Periods	
	Date Range	Lump-Sum Reasonable Royalty
'421 ²⁷⁴	April 18, 2017 – November 2021	████████████████████
	May 21, 2019 – November 2021	████████████████████
'321	September 1, 2014 – November 2021	██████████
	May 21, 2019 – November 2021	██████████
'437	July 10, 2013 – November 2021	████████████████████
	May 21, 2019 – November 2021	████████████████████
'179	July 10, 2013 – November 2021	████████████████████
	May 21, 2019 – November 2021	████████████████████

D. Economic Analysis of the *Georgia-Pacific* Factors

88. The *Georgia-Pacific* decision sets out a list of factors that may be used to analyze aspects of the hypothetical negotiation that forms the basis of the reasonable royalty determination.²⁷⁵ In the previous sections I have analyzed the most relevant economic evidence for determining a reasonable royalty for a license to the SAP patents-in-suit in the context of an April 2017 hypothetical negotiation for the '421 patent, September 2014 hypothetical negotiation for the '321 patent, and May 2013 hypothetical negotiation for the '437 and '179 patents between SAP and Teradata. This economic evidence is relevant to many of the *Georgia-Pacific* factors. Below, I review each *Georgia-Pacific* factor and explain the likely impact, if any, that each

²⁷³ Exhibit 3a. See Exhibit 3b for my calculation of lump-sum reasonable royalties for the SAP patents-in-suit under the Profit Apportionment Approach for Damages Scenario 2.

²⁷⁴ In my calculation of damages for Teradata's infringement of the '421 patent I conservatively do not include damages associated with the '421 patent accused product, TIM. I note that according to Wayne Boyle of Teradata, "TIM was a very important technology to implement on a Teradata database" and "there was a great deal of use of TIM in the customer database." Deposition of Wayne Boyle, February 25, 2021, pp. 103-104.

factor would have had on the outcome of the hypothetical negotiations for a license to the SAP patents-in-suit.

1. *Georgia-Pacific Factor 1: The Royalties Received by the Patentee for the Licensing the Patent-In-Suit, Proving or Tending to Prove an Established Royalty*

89. *Georgia-Pacific* Factor 1 considers, among other things, licenses to the patents-in-suit. These licenses may, under certain circumstances, represent arm's-length transactions that shed light on the value of a license to the patents-in-suit. For example, licenses signed under comparable economic circumstances surrounding the hypothetical negotiation, as well as licenses for which adjustments can be made to account for any significant dissimilarities, may provide evidence useful for determining the royalty that the parties would have agreed to during the hypothetical negotiation. If the economic circumstances surrounding the licenses are not comparable to those of the hypothetical negotiation, and it is not possible to reliably adjust to account for dissimilarities, then the license should not be used as a comparable license.

90. [REDACTED]

[REDACTED]²⁷⁶ A summary of the relevant terms and conditions of these SAP agreements is provided in Exhibit 10a. I understand that some of the SAP patents-in-suit are covered under these agreements.²⁷⁷ However, these agreements are not useful for establishing a reasonable royalty for any of the SAP patents-in-suit [REDACTED]

[REDACTED]

²⁷⁵ *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970).

²⁷⁶ SAP_02684433; SAP_02684444; SAP_63723577; SAP_02684558; SAP-MS_00000310; SAP_02684582. See also Exhibit 10a.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

91. Since there are no patent license agreements that include an established royalty for any of the SAP patents-in-suit, this *Georgia-Pacific* factor has no effect on my reasonable royalty analysis.

2. *Georgia-Pacific* Factor 2: The Rates Paid by the Licensee for the Use of Other Patents Comparable to the Patent-in-Suit

92. *Georgia-Pacific* Factor 2 considers, among other things, agreements entered by Teradata in which it has received licenses to patents. As discussed above under Section VI.B. (*Georgia-Pacific* Factor 12), before using a license as a comparable for determining the outcome of the hypothetical negotiation, one must assess whether the economic circumstances surrounding the license are sufficiently comparable to those surrounding the hypothetical negotiation and, if not, whether adjustments can be made to account for any significant dissimilarities. If the economic circumstances are not comparable and reliable adjustments cannot be made, then the license should not be used as a comparable.

93. I have reviewed the Teradata agreements produced in this matter that have involved, among other things, Teradata receiving licenses to patents. A summary of the relevant terms and

²⁷⁷ Deposition 30(b)(1) of Kevin Prey, February 9, 2020, pp. 14-15.

²⁷⁸ SAP_02684433; SAP_02684444; SAP_63723577; SAP_02684558; SAP-MS_00000310. See also Exhibit 10a.

²⁷⁹ Deposition 30(b)(1) of Kevin Prey, February 9, 2020, pp. 15-16.

conditions of these Teradata agreements is provided in Exhibit 10b. Based on my review of these agreements and the corresponding deposition testimony and related documents, I find that none of these agreements are useful for establishing a reasonable royalty for a hypothetical license to the SAP patents-in-suit.

[illegible]

²⁸⁰ Deposition 30(b)(6) of Steven Weber, February 5, 2021, pp. 22-24; TD01894122 at 122-123; TD01894105 at 106.

²⁸¹ Deposition 30(b)(6) of Steven Weber, February 5, 2021, pp. 29-30.

282 TD01894144 at 144-145.

²⁸³ Deposition 30(b)(6) of Steven Weber, February 5, 2021, pp. 32-33.

²⁸⁴ Deposition 30(b)(6) of Steven Weber, February 5, 2021, pp. 39-51.

²⁸⁵ Deposition 30(b)(6) of Steven Weber, February 5, 2021, pp. 46-47; Exhibit 10b.

[REDACTED]

95. Since there are no agreements where Teradata licensed in patents that are useful for establishing a reasonable royalty for any of the SAP patents-in-suit, this *Georgia-Pacific* factor has no effect on my reasonable royalty analysis.

3. *Georgia-Pacific Factor 3: The Nature of the Scope of the License, as Exclusive or Non-Exclusive; or as Restricted or Non-Restricted in Terms of Territory or with Respect to Whom the Manufactured Product May Be Sold*

96. All else equal, a non-exclusive license would result in a lower royalty than a royalty that would prevail for an exclusive license. Additionally, all else equal, a license limited geographically to the United States would result in a lower royalty than a royalty that would prevail for a worldwide license. I analyze this *Georgia-Pacific* factor relative to my reasonable royalty analyses performed under the Comparable License Approach and Profit Apportionment Approach.

97. [REDACTED]

[REDACTED]

²⁸⁶ Deposition 30(b)(6) of Steven Weber, February 5, 2021, pp. 47-48; Exhibit 10b.

²⁸⁷ Deposition 30(b)(6) of Steven Weber, February 5, 2021, pp. 48-51; Exhibit 10b.

²⁸⁸ Deposition 30(b)(6) of Steven Weber, February 5, 2021, pp. 46-48.

²⁸⁹ Deposition 30(b)(6) of Steven Weber, February 5, 2021, pp. 54-55, 64-65.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] As a result, this *Georgia-Pacific* factor has no further effect on my reasonable royalty analysis under the Comparable License Approach.

98. My reasonable royalty analysis where I apportioned the expected incremental profits of the Teradata Accused Products to the claimed technologies of the SAP patents-in-suit assumes a non-exclusive, U.S.-only license to the SAP patents-in-suit covering the Teradata Accused Products. First, the assumption of a non-exclusive license to the SAP patents-in-suit is consistent with Teradata's alleged infringement of these patents; in other words, Teradata's alleged use of the SAP patented technologies assumes that they were used non-exclusively, and not exclusively. Second, the assumption of a U.S.-only license to the SAP patents-in-suit is consistent with the fact that the expected revenues for the Teradata Accused Products used in my damages calculation are the revenues generated from only those sales that allegedly infringe the SAP patents-in-suit.²⁹¹ Therefore, my reasonable royalty damages calculation based on apportionment of the expected incremental profits of the Teradata Accused Products reflects the non-exclusive, U.S.-only assumptions of the hypothetical license. As a result, this *Georgia-*

²⁹⁰ SAP_02684682-710 at 687; SAP_43550525; Exhibit 10a. See also Section VI.B.1 above.

²⁹¹ Under Damages Scenario 1, I have been asked to exclude revenues identified as associated with transactions in Teradata's Sales Data that have a non-U.S. Country Code or Country Name (which I refer to for convenience as "non-U.S. revenues") in my calculation of the accused revenues for the Teradata Accused Products. Under Damages Scenario 2, I have been asked to include these "non-U.S. revenues" in my calculation of the accused revenues for the Teradata Accused Products. I have included these "non-U.S. revenues" for informational

Pacific factor has no further effect on my reasonable royalty analysis under the Profit Apportionment Approach.

4. *Georgia-Pacific Factor 4: The Licensor's Established Policy and Marketing Program to Maintain His Patent Monopoly by Not Licensing Others To Use the Invention; or by Granting Licenses under Special Conditions Designed to Preserve That Monopoly*

99. All else equal, the fact that a licensor has no plan to maintain its patent monopoly by refusing to license its patents would reduce the royalty that a prospective licensee would be expected to pay.

100. As discussed under *Georgia-Pacific* Factor 1, [REDACTED]. Given that [REDACTED]. SAP would be unwilling to grant a one-way license to the SAP patents-in-suit to Teradata, a company that participated as a supplier in the same overall industry, all else equal, this *Georgia-Pacific* factor would have a small upward effect on my reasonable royalty analyses under the Comparable License Approach and Profit Apportionment Approach. However, under both approaches, I conservatively do not make any adjustment to account for these small effects.

5. *Georgia-Pacific Factor 5: The Commercial Relationship between the Licensor and Licensee, Such As Whether They Are Competitors in the Same Territory in the Same Line of Business; or Whether They Are Inventor and Promoter*

101. *Georgia-Pacific* Factor 5 addresses the competition between the licensor and licensee at the time of the hypothetical negotiation pertaining to the accused products. All else equal, if the licensor and licensee are not competitors at the time of the hypothetical negotiation, this factor would result in a lower royalty than a royalty that would prevail if the licensor and licensee were

purposes and do not express an opinion here as to whether the legal requirements for their inclusion in a damages

actual competitors. I analyze this *Georgia-Pacific* factor relative to my reasonable royalty analyses performed under the Comparable License Approach and Profit Apportionment Approach.

102. In this matter the relevant competition to address is the competition between SAP and Teradata pertaining to the Teradata Accused Products around the time of the May 2013, September 2014, and April 2017 hypothetical negotiations. At the time of the hypothetical negotiations, SAP and Teradata participated as suppliers in the same overall industry, but the products in this industry as a general matter are highly differentiated. Moreover, some products have certain complementarities with other products (i.e., they can be used together, rather than as substitutes for each other). Teradata did not consider SAP products to be particularly close substitutes for its products. For example, in both its annual reports for the fiscal years ending December 31, 2013 and December 31, 2014, Teradata described its competition in the analytic data platforms market as “highly competitive, and we face a number of large traditional competitors, such as IBM and Oracle.”²⁹² Teradata further describes its business relationships with companies that operate in markets adjacent to the analytic data platforms market, “such as enterprise analytic and business intelligence application software. The status of our business relationships with these companies can influence our ability to compete. Our products also complement offerings of some of our competitors, with whom we have formed partnerships to work with their business intelligence and application software businesses. Examples of these companies include both IBM and Oracle, due to their acquisitions of other business intelligence,

calculation are satisfied.

²⁹² Teradata 2013 10-K, p. 10; Teradata 2014 10-K, p. 10.

consulting and application software companies in recent years.”²⁹³ In Teradata’s annual report for the fiscal year ending December 31, 2017, it described its competition as “new analytics services companies, cloud vendors and open source providers, as well as large traditional competitors, such as IBM, SAP and Oracle.”²⁹⁴

103. JuxtaComm and SAP were not competitors related to the accused Business Objects products that were the subject of the JuxtaComm-SAP agreement.²⁹⁵ As a result, all else equal, this *Georgia-Pacific* factor would have a small upward effect on my reasonable royalty analysis under the Comparable License Approach. Similarly, under the Profit Apportionment Approach, this factor would have a small upward effect on the royalty. However, under both approaches, I conservatively do not make any adjustment to account for these small effects.

6. *Georgia-Pacific* Factor 6: The Effect of Selling the Patented Specialty in Promoting Sales of Other Products of the Licensee; the Existing Value of the Invention to the Licensor as a Generator of Sales of His Non-Patented Items; and the Extent of Such Derivative or Convoyed Sales

104. I have excluded sales of maintenance and services associated with the expected sales of the Teradata Accused Products under my calculation of reasonable royalty damages under both the Comparable License and Profit Apportionment Approaches. As a result, this *Georgia-Pacific* factor has no effect on my reasonable royalty analyses under the Comparable License Approach and Profit Apportionment Approach.

²⁹³ Teradata 2013 10-K, p. 10; Teradata 2014 10-K, p. 11.

²⁹⁴ Teradata 2017 10-K, p. 8.

²⁹⁵ I understand that JuxtaComm is an organization that “use[s] patents to generate revenue without manufacturing, promoting, or marketing products or investing in research and development in bringing products to market” and therefore does not compete directly with SAP or Business Objects. See Informatica Corporation Form 10-K for the fiscal year ended December 31, 2008, pp. 19-20 (“In addition, there is a growing occurrence of patent suits being brought by organizations that use patents to generate revenue... For example, on August 21, 2007, JuxtaComm Technologies filed a complaint... alleging patent infringement against the following defendants: ...Business Objects SA,...Informatica Corporation”).

7. *Georgia-Pacific Factor 7: The Duration of the Patent and the Term of the License*

105. The term of the hypothetical license between SAP and Teradata would begin on the date of first infringement—April 18, 2017 for the '421 patent, September 1, 2014 for the '321 patent, and May 1, 2013 for the '437 and '179 patents—and extend through the expected November 2021 trial. I have limited the term of the hypothetical license to the November 2021 trial date since I understand that SAP is seeking damages through the date of judgment only, and post-judgment is seeking an injunction. I analyze this *Georgia-Pacific* factor relative to my reasonable royalty analyses performed under the Comparable License Approach and Profit Apportionment Approach.

106. Under both damages approaches, my reasonable royalty calculations assume that the term of the hypothetical license between SAP and Teradata for the SAP patents-in-suit would begin on the date of first infringement and extend through the expected November 2021 trial. Therefore, I have already properly accounted for the term of the hypothetical license, and corresponding damages periods, in my reasonable royalty analyses. As a result, this *Georgia-Pacific* factor has no further effect on my reasonable royalty analyses under the Comparable License Approach and Profit Apportionment Approach.

8. *Georgia-Pacific Factor 8: The Established Profitability of the Product Made Under the Patent; its Commercial Success; and its Current Popularity*

107. I have addressed *Georgia-Pacific* Factor 8 in Section VI.C under my reasonable royalty analysis where I apportioned the expected incremental revenues and profits of the Teradata Accused Products to the claimed technologies of the SAP patents-in-suit. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]. As a result, this *Georgia-Pacific* factor has no further effect on my reasonable royalty analyses under the Comparable License Approach and Profit Apportionment Approach.

9. *Georgia-Pacific* Factor 9: The Utility and Advantages of the Patented Property over the Old Modes or Devices, If Any, That Had Been Used for Working Out Similar Results;

***Georgia-Pacific* Factor 10: The Nature of the Patented Invention; The Character of the Commercial Embodiment of It as Owned and Produced by the Licensor; and the Benefits to Those Who Have Used the Invention; and**

***Georgia-Pacific* Factor 11: The Extent to Which the Infringer Has Made Use of the Inventions; and Any Evidence Probative of the Value of that Use**

108. In the context of this matter, *Georgia-Pacific* Factors 9, 10, and 11 raise similar economic considerations and, therefore, I evaluate them together. These factors consider the incremental value of each of the SAP patents-in-suit over old modes and prior art, as well as the availability of acceptable non-infringing alternatives. *Georgia-Pacific* Factor 11 also considers the “extent” to which each patent is used, that is, the frequency and time horizon of use.

109. I understand the Wolfson Report identifies the percentage value of the Teradata Accused Products that should be apportioned to the functionality covered by each of the SAP patents-in-suit. Relying in part on that information, I have already considered under the Profit Apportionment Approach the incremental value of the SAP patents-in-suit over, for example, the features available in earlier versions of the Teradata Accused Products (which do not contain the functionality covered by the SAP patents-in-suit).²⁹⁶ Moreover, my analysis under both damages

²⁹⁶ See Section VI.C.

approaches—and for each of the SAP patents-in-suit—accounts for the frequency and time horizon of Teradata’s infringement.²⁹⁷

110. To evaluate whether acceptable non-infringing alternatives were available on the date of first infringement, I consider—among other things—the cost of the purported alternatives, their features and functionality, the cost of degraded functionality, and their economic viability. Based on my review of certain of Teradata’s responses to written discovery, the deposition testimony of Teradata’s corporate representative, Grace Au, and SAP’s damages contentions, among other information, I have not seen evidence establishing the availability of acceptable non-infringing alternatives.

111. I have reviewed Teradata’s Response to SAP’s Interrogatory No. 38 (and Teradata’s First, Corrected First, and Second Supplemental and Amended Response thereto),²⁹⁸ Teradata’s Response to SAP’s Interrogatory No. 21 (and Teradata’s First, Second, and Third Amended and Supplemental Response thereto),²⁹⁹ Teradata’s Response to SAP’s Interrogatory No. 28 (and

²⁹⁷ See, e.g., Sections VI.B.1 and VI.C.

²⁹⁸ Plaintiffs’ Responses to Defendants’ Fourth Set of Interrogatories (Nos. 29-41), April 6, 2020, Response to Interrogatory No. 38, pp. 23-25; Plaintiffs’ Fourth Supplemental and Amended Responses to Defendants’ Fourth Set of Interrogatories (Nos. 38, 39), October 26, 2020, First Supplemental and Amended Response to Interrogatory No. 38, pp. 4-11; Plaintiffs’ Corrected Fourth Supplemental and Amended Responses to Defendants’ Fourth Set of Interrogatories (Nos. 38, 39), October 30, 2020, First Supplemental and Amended Response to Interrogatory No. 38, pp. 4-11; and Plaintiffs’ Sixth Supplemental and Amended Responses to Defendants’ Fourth Set of Interrogatories (Nos. 30, 35–38, 40), February 12, 2021, Second Supplemental Response to Interrogatory No. 38, pp. 16-17.

²⁹⁹ Plaintiffs’ Responses to Defendants’ Third Set of Interrogatories (Nos. 19-28), December 3, 2019, Response to Interrogatory No. 21, pp. 6-34; Plaintiffs’ Fifth Amended and Supplemental Responses to Defendants’ Third Set of Interrogatories (Nos. 21, 26), October 26, 2020, First Supplemental and Amended Response to Interrogatory No. 21, pp. 4-64; Plaintiffs’ Corrected Fifth Supplemental and Amended Responses to Defendants’ Third Set of Interrogatories (Nos. 21, 26), October 30, 2020, Second Amended and Supplemental Response to Interrogatory No. 21, pp. 4-64; and Plaintiffs’ Eighth Supplemental and Amended Responses to Defendants’ Third Set of Interrogatories (Nos. 19, 21, 22, 23, 26, 27), February 12, 2021, Third Amended and Supplemental Response to Interrogatory No. 21, pp. 7-80.

Teradata's First and Second Supplemental Response thereto),³⁰⁰ and Teradata's Response and Corrected Response to SAP's Document Request Nos. 162, 163, and 164.³⁰¹

112. Teradata has asserted that acceptable non-infringing alternatives include earlier versions of its products that do not contain the infringing technology, current versions of its products with the infringing technology assumed to be stripped out or never used, and other products that do not contain the technology covered by the SAP patents-in-suit.³⁰² However, to date, Teradata has not sufficiently described these purported alternatives: for example, Teradata has not specified whether such products would have provided the same functionality as the Teradata Accused Products and what costs would have been associated with implementing and using them.³⁰³ Teradata has also asserted that "[s]everal non-infringing alternatives could be implemented through Teradata's existing development processes with limited expense and effort."³⁰⁴ However, again, Teradata has not sufficiently described these purported alternatives.

³⁰⁰ Plaintiffs' Responses to Defendants' Third Set of Interrogatories (Nos. 19-28), December 3, 2019, Response to Interrogatory No. 28, pp. 39-40; Plaintiffs' Supplemental Responses to Defendants' Third Set of Interrogatories, April 24, 2020, Supplemental Response to Interrogatory No. 28, pp. 5-12; and Plaintiffs' Second Supplemental Responses to Defendants' Third Set of Interrogatories, January 29, 2021, Second Supplemental Response to Interrogatory No. 28, pp. 5-11.

³⁰¹ Plaintiffs' Responses to Defendants' Fourth Set of Document Requests, November 25, 2019, Response to Document Request Nos. 162, 163, and 164, pp. 5-7; Plaintiffs' Corrected Responses to Defendants' Fourth Set of Document Requests, November 25, 2019, Response to Document Request Nos. 162, 163, and 164, pp. 5-7.

³⁰² Plaintiffs' Fourth Supplemental and Amended Responses to Defendants' Fourth Set of Interrogatories (Nos. 38, 39), October 26, 2020, First Supplemental and Amended Response to Interrogatory No. 38, pp. 4-11; Plaintiffs' Corrected Fourth Supplemental and Amended Responses to Defendants' Fourth Set of Interrogatories (Nos. 38, 39), October 30, 2020, First Supplemental and Amended Response to Interrogatory No. 38, pp. 4-11.

³⁰³ See, e.g., Plaintiffs' Fourth Supplemental and Amended Responses to Defendants' Fourth Set of Interrogatories (Nos. 38, 39), October 26, 2020, First Supplemental and Amended Response to Interrogatory No. 38, pp. 4-11; Plaintiffs' Corrected Fourth Supplemental and Amended Responses to Defendants' Fourth Set of Interrogatories (Nos. 38, 39), October 30, 2020, First Supplemental and Amended Response to Interrogatory No. 38, pp. 4-11; *see also, e.g.*, Plaintiffs' Responses to Defendants' Fourth Set of Document Requests, November 25, 2019, Response to Document Request Nos. 162, 163, and 164, pp. 5-7; Plaintiffs' Corrected Responses to Defendants' Fourth Set of Document Requests, November 25, 2019, Response to Document Request Nos. 162, 163, and 164, pp. 5-7.

³⁰⁴ Plaintiffs' Sixth Supplemental and Amended Responses to Defendants' Fourth Set of Interrogatories (Nos. 30, 35-38, 40), February 12, 2021, Second Supplemental Response to Interrogatory No. 38, p. 17.

Teradata has not described, for example, the cost of development and implementation, the time required, or the risks associated with such a development effort.³⁰⁵ Based on my review of the information Teradata has provided—as well as other information discussed in this report and in the Wolfson Report—I conclude Teradata has not demonstrated with sufficient specificity the availability of acceptable non-infringing alternatives. Nonetheless, I reserve the right to respond to an attempt by Teradata to provide sufficient information about the availability of any purportedly acceptable non-infringing alternatives.

113. I have also reviewed the deposition testimony of Grace Au as corporate representative of Teradata.³⁰⁶ Among the testimony I reviewed was, for example, the portion in which counsel for SAP asked Ms. Au if “functionality similar to Teradata Columnar [was] available prior to the release of Teradata Columnar.”³⁰⁷ Ms. Au replied “[a]s far as I know, there’s no functionality similar to Teradata Column- --Columnar [sic] available prior to the release to the 14.10.”³⁰⁸ I also reviewed—among other information—the portion in which counsel for SAP asked Ms. Au “if a Teradata customer wanted to have the functionality in Teradata Columnar, but they were unable to have access to Teradata Columnar, is there any other software products they could use that would provide similar functionality,” Ms. Au replied “[n]ot that I’m aware of.”³⁰⁹ Based on my review of this deposition testimony, I conclude Teradata has not only failed to demonstrate the availability of acceptable non-infringing alternatives, but also that Teradata is unaware of any acceptable non-infringing alternatives to the functionality covered by the ’421 patent.

³⁰⁵ See, e.g., Plaintiffs’ Sixth Supplemental and Amended Responses to Defendants’ Fourth Set of Interrogatories (Nos. 30, 35–38, 40), February 12, 2021, Second Supplemental Response to Interrogatory No. 38, pp. 16-17.

³⁰⁶ Deposition 30(b)(6) of Grace Au, January 7, 2021.

³⁰⁷ Deposition 30(b)(6) of Grace Au, January 7, 2021, p. 18.

³⁰⁸ Deposition 30(b)(6) of Grace Au, January 7, 2021, p. 18.

114. Finally, I have also reviewed SAP's Patent L.R. 3-8 Damages Contentions and Supplement thereto.³¹⁰ Based on my review, I understand SAP has not identified any acceptable non-infringing alternatives as of the date of this report.³¹¹

115. Given Teradata's inability to describe, value, and, consequently, to establish the availability of any acceptable non-infringing alternatives—and given the Comparable License Approach and Profit Apportionment Approach already take into account *Georgia-Pacific* Factors 9, 10, and 11—these factors have no further effect on my reasonable royalty analysis.

10. *Georgia-Pacific* Factor 12: The Portion of the Profit or of the Selling Price That May Be Customary in the Particular Business or in Comparable Businesses to Allow for the Use of the Invention or Analogous Inventions

116. I have addressed *Georgia-Pacific* Factor 12 above in Section VI.B where I reviewed and analyzed the SAP agreements produced in this matter that have involved, among other things, SAP granting licenses to patents or receiving licenses to patents. As discussed in detail in that section, I used the JuxtaComm-SAP agreement as a benchmark for the outcome of the hypothetical negotiation for the '421 and '321 patents and adjusted the [REDACTED] to account for economic differences between this benchmark agreement and the hypothetical license. I also used the SAP-ServiceNow agreements and the real-world patent valuation approach implemented by SAP in its negotiations with ServiceNow to support my use of the JuxtaComm-SAP agreement as a benchmark. As a result, this *Georgia-Pacific* factor has no further effect on my reasonable royalty analysis under the Comparable License Approach.

³⁰⁹ Deposition 30(b)(6) of Grace Au, January 7, 2021, p. 51.

³¹⁰ Defendants' Patent L.R. 3-8 Damages Contentions, December 20, 2019; Defendants' Supplement to Patent L.R. 3-8 Damages Contentions, October 12, 2020.

³¹¹ Defendants' Supplement to Patent L.R. 3-8 Damages Contentions, October 12, 2020, Section F, p. 13 ("For its part, SAP has informed Teradata that it has not located any qualifying noninfringing alternative.").

117. *Georgia-Pacific* Factor 12 also considers agreements entered by Teradata in which it has granted licenses to patents. I have reviewed the Teradata agreements produced in this matter that have involved, among other things, Teradata granting licenses to patents to other entities. A summary of the relevant terms and conditions of these Teradata agreements is provided in Exhibit 10b. Based on my review of these agreements and the corresponding deposition testimony and related documents, I find that none of these agreements are useful for establishing a reasonable royalty for a hypothetical license to the SAP patents-in-suit [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

³¹² Deposition 30(b)(6) of Steven Weber, February 5, 2021, pp. 36-37.

³¹³ Deposition 30(b)(6) of Steven Weber, February 5, 2021, pp. 37-39.

³¹⁴ Deposition 30(b)(6) of Steven Weber, February 5, 2021, pp. 44-46.

³¹⁵ Deposition 30(b)(6) of Steven Weber, February 5, 2021, pp. 37-40, 45-46.

³¹⁶ Deposition 30(b)(6) of Steven Weber, February 5, 2021, pp. 54-55, 64-65.

118. Since there are no agreements where Teradata licensed out patents that are useful for establishing a reasonable royalty for any of the SAP patents-in-suit, this *Georgia-Pacific* factor has no effect on my reasonable royalty analysis.

11. *Georgia-Pacific Factor 13: The Portion of the Realizable Profit That Should Be Credited to the Invention as Distinguished from Non-Patented Elements, the Manufacturing Process, Business Risks, or Significant Features or Improvements Added by the Infringer*

119. I have addressed *Georgia-Pacific* Factor 13 in Section VI.C under my reasonable royalty analysis where I apportioned the expected incremental profits of the Teradata Accused Products to the claimed technologies of the SAP patents-in-suit to reflect “the portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements.” I split the remaining profit between SAP and Teradata, which further accounts for Teradata’s contributions. As a result, this *Georgia-Pacific* factor has no further effect on my reasonable royalty analysis under the Profit Apportionment Approach.

120. I have also addressed *Georgia-Pacific* Factor 13 in Section VI.B.1 where I adjusted [REDACTED] to reflect the proper apportionment to the claimed technologies of the ’421 and ’321 patents. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] As a result, this *Georgia-Pacific* factor has no further effect on my reasonable royalty analysis under the Comparable License Approach.

12. *Georgia-Pacific Factor 14: The Opinion Testimony of Qualified Experts*

121. With respect to this *Georgia-Pacific* factor, I reference this report in its entirety, along with testimony I will give at any deposition and at any trial or hearing in this matter.

13. *Georgia-Pacific Factor 15: Outcome of the Hypothetical Negotiation*³¹⁷

122. Based on the relevant economic evidence analyzed throughout this report (including the *Georgia-Pacific* factors) it is my opinion that a conservative outcome of the hypothetical negotiations for a non-exclusive, U.S.-only license to each of the SAP patents-in-suit under Damages Scenario 1 would be as follows:

- April 2017 Hypothetical Negotiation for the '421 Patent
 - Comparable License Approach³¹⁸
 - My economic damages analysis based on the comparable JuxtaComm-SAP agreement, as specifically addressed under *Georgia-Pacific* Factor 12, results in lump-sum reasonable royalties for the '421 patent of [REDACTED] for the damages period from April 18, 2017 through November 2021 and [REDACTED] for the damages period from May 21, 2019 through November 2021.³¹⁹ My Comparable License Approach is supported by the real-world patent valuation approach implemented by SAP in its negotiations with ServiceNow leading to the SAP-ServiceNow agreements.
 - The adjustments I have made to the [REDACTED] address many of the considerations under the remaining *Georgia-Pacific* factors.
 - (1) The revenue adjustment accounts for the scope of the SAP-Teradata hypothetical license (*Georgia-Pacific* Factor 3), term of the SAP-Teradata hypothetical license (*Georgia-Pacific* Factor 7), and the commercial success and revenues of the Teradata Accused Products (*Georgia-Pacific* Factor 8).

³¹⁷ Specifically, “[t]he amount that a licensor (such as the patentee) and a licensee (such as the infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement; that is, the amount which a prudent licensee—who desired, as a business proposition, to obtain a license to manufacture and sell a particular article embodying the patented invention—would have been willing to pay as a royalty and yet be able to make a reasonable profit and which amount would have been acceptable by a prudent patentee who was willing to grant a license.” See *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970).

³¹⁸ See Exhibit 2b for my calculation of lump-sum reasonable royalties for the '421 patent under the Comparable License Approach for Damages Scenario 2.

³¹⁹ Exhibit 2a.

- (2) The technical value adjustment accounts for the apportionment to the claimed technology of the '421 patent (*Georgia-Pacific* Factor 13).
- (3) The validity and infringement adjustment accounts for the assumptions of validity and infringement for the '421 patent at the SAP-Teradata hypothetical negotiation (*Georgia-Pacific* Factor 15).
- (4) Furthermore, I have accounted for the incremental value of the '421 patented technology over not having this technology implemented in the Teradata Accused Products (*Georgia-Pacific* Factors 9, 10, and 11).
- There are additional considerations under the *Georgia-Pacific* factors that would have an upward effect on the reasonable royalties for the '421 patent under the Comparable License Approach, but I conservatively do not make any adjustments for these effects.
 - (1) SAP would be unwilling to grant a one-way license to the '421 patent to Teradata, a company that participated as a supplier in the same overall industry (*Georgia-Pacific* Factor 4).
 - (2) JuxtaComm and SAP were not competitors related to the accused Business Objects products that were the subject of the JuxtaComm-SAP agreement, while SAP and Teradata participated as suppliers in the same overall industry (*Georgia-Pacific* Factor 5).
- Profit Apportionment Approach³²⁰
 - My economic damages analysis based on the apportionment of the expected profits of the Teradata Accused Products to the claimed technologies of the '421 patent, as specifically addressed under *Georgia-Pacific* Factors 8 and 13, results in lump-sum reasonable royalties for the '421 patent of [REDACTED] for the damages period from April 18, 2017 through November 2021 and [REDACTED] for the damages period from May 21, 2019 through November 2021.³²¹
 - The steps in my Profit Apportionment Approach address many of the considerations under the remaining *Georgia-Pacific* factors.
 - (1) The expected revenues for the Teradata Accused Products used in this approach account for the scope of the SAP-Teradata hypothetical license (*Georgia-Pacific* Factor 3) and the term of the SAP-Teradata hypothetical license (*Georgia-Pacific* Factor 7).
 - (2) The split of the apportioned incremental profits for the Teradata Accused Products between SAP and Teradata further apportions for Teradata's contributions to the accused products (*Georgia-Pacific* Factor 13).

³²⁰ See Exhibit 3b for my calculation of lump-sum reasonable royalties for the '421 patent under the Profit Apportionment Approach for Damages Scenario 2.

³²¹ Exhibit 3a.

- (3) Furthermore, I have accounted for the incremental value of the '421 patented technology over not having this technology implemented in the Teradata Accused Products (*Georgia-Pacific* Factors 9, 10, and 11).
- There are additional considerations under the *Georgia-Pacific* factors that would have an upward effect on the reasonable royalties for the '421 patent under the Profit Apportionment Approach, but I conservatively do not make any adjustments for these effects.
 - (1) SAP would be unwilling to grant a one-way license to the '421 patent to Teradata, a company that participated as a supplier in the same overall industry (*Georgia-Pacific* Factor 4).
 - (2) SAP and Teradata participated as suppliers in the same overall industry, although they were not direct competitors related to the Teradata Accused Products (*Georgia-Pacific* Factor 5).
 - September 2014 Hypothetical Negotiation for the '321 Patent
 - Comparable License Approach³²²
 - My economic damages analysis based on the comparable JuxtaComm-SAP agreement, as specifically addressed under *Georgia-Pacific* Factor 12, results in lump-sum reasonable royalties for the '321 patent of [REDACTED] for the damages period from September 1, 2014 through November 2021 and [REDACTED] for the damages period from May 21, 2019 through November 2021.³²³ My Comparable License Approach is supported by the real-world patent valuation approach implemented by SAP in its negotiations with ServiceNow leading to the SAP-ServiceNow agreements.
 - The adjustments I have made to the [REDACTED] address many of the considerations under the remaining *Georgia-Pacific* factors.
 - (1) The revenue adjustment accounts for the scope of the SAP-Teradata hypothetical license (*Georgia-Pacific* Factor 3), term of the SAP-Teradata hypothetical license (*Georgia-Pacific* Factor 7), and the commercial success and revenues of the Teradata Accused Products (*Georgia-Pacific* Factor 8).
 - (2) The technical value adjustment accounts for the apportionment to the claimed technology of the '321 patent (*Georgia-Pacific* Factor 13).
 - (3) The validity and infringement adjustment accounts for the assumptions of validity and infringement for the '321 patent at the SAP-Teradata hypothetical negotiation (*Georgia-Pacific* Factor 15).

³²² See Exhibit 2b for my calculation of lump-sum reasonable royalties for the '321 patent under the Comparable License Approach for Damages Scenario 2.

³²³ Exhibit 2a.

- (4) Furthermore, I have accounted for the incremental value of the '321 patented technology over not having this technology implemented in the Teradata Accused Products (*Georgia-Pacific* Factors 9, 10, and 11).
- There are additional considerations under the *Georgia-Pacific* factors that would have an upward effect on the reasonable royalties for the '321 patent under the Comparable License Approach, but I conservatively do not make any adjustments for these effects.
 - (1) SAP would be unwilling to grant a one-way license to the '321 patent to Teradata, a company that participated as a supplier in the same overall industry (*Georgia-Pacific* Factor 4).
 - (2) JuxtaComm and SAP were not competitors related to the accused Business Objects products that were the subject of the JuxtaComm-SAP agreement, while SAP and Teradata participated as suppliers in the same overall industry (*Georgia-Pacific* Factor 5).
 - Profit Apportionment Approach³²⁴
 - My economic damages analysis based on the apportionment of the expected profits of the Teradata Accused Products to the claimed technologies of the '321 patent, as specifically addressed under *Georgia-Pacific* Factors 8 and 13, results in lump-sum reasonable royalties for the '321 patent of [REDACTED] for the damages period from September 1, 2014 through November 2021 and [REDACTED] for the damages period from May 21, 2019 through November 2021.³²⁵
 - The steps in my Profit Apportionment Approach address many of the considerations under the remaining *Georgia-Pacific* factors.
 - (1) The expected revenues for the Teradata Accused Products used in this approach account for the scope of the SAP-Teradata hypothetical license (*Georgia-Pacific* Factor 3) and the term of the SAP-Teradata hypothetical license (*Georgia-Pacific* Factor 7).
 - (2) The split of the apportioned incremental profits for the Teradata Accused Products between SAP and Teradata further apportions for Teradata's contributions to the accused products (*Georgia-Pacific* Factor 13).
 - (3) Furthermore, I have accounted for the incremental value of the '321 patented technology over not having this technology implemented in the Teradata Accused Products (*Georgia-Pacific* Factors 9, 10, and 11).
 - There are additional considerations under the *Georgia-Pacific* factors that would have an upward effect on the reasonable royalties for the '321 patent under the Profit

³²⁴ See Exhibit 3b for my calculation of lump-sum reasonable royalties for the '321 patent under the Profit Apportionment Approach for Damages Scenario 2.

³²⁵ Exhibit 3a.

Apportionment Approach, but I conservatively do not make any adjustments for these effects.

- (1) SAP would be unwilling to grant a one-way license to the '321 patent to Teradata, a company that participated as a supplier in the same overall industry (*Georgia-Pacific* Factor 4).
- (2) SAP and Teradata participated as suppliers in the same overall industry, although they were not direct competitors related to the Teradata Accused Products (*Georgia-Pacific* Factor 5).

- May 2013 Hypothetical Negotiation for the '437 Patent

- Profit Apportionment Approach³²⁶

- My economic damages analysis based on the apportionment of the expected profits of the Teradata Accused Products to the claimed technologies of the '437 patent, as specifically addressed under *Georgia-Pacific* Factors 8 and 13, results in lump-sum reasonable royalties for the '437 patent of [REDACTED] for the damages period from July 10, 2013 through November 2021 and [REDACTED] for the damages period from May 21, 2019 through November 2021.³²⁷
 - The steps in my Profit Apportionment Approach address many of the considerations under the remaining *Georgia-Pacific* factors.
 - (1) The expected revenues for the Teradata Accused Products used in this approach account for the scope of the SAP-Teradata hypothetical license (*Georgia-Pacific* Factor 3) and the term of the SAP-Teradata hypothetical license (*Georgia-Pacific* Factor 7).
 - (2) The split of the apportioned incremental profits for the Teradata Accused Products between SAP and Teradata further apportions for Teradata's contributions to the accused products (*Georgia-Pacific* Factor 13).
 - (3) Furthermore, I have accounted for the incremental value of the '437 patented technology over not having this technology implemented in the Teradata Accused Products (*Georgia-Pacific* Factors 9, 10, and 11).
 - There are additional considerations under the *Georgia-Pacific* factors that would have an upward effect on the reasonable royalties for the '437 patent under the Profit Apportionment Approach, but I conservatively do not make any adjustments for these effects.
 - (1) SAP would be unwilling to grant a one-way license to the '437 patent to Teradata, a company that participated as a supplier in the same overall industry (*Georgia-Pacific* Factor 4).

³²⁶ See Exhibit 3b for my calculation of lump-sum reasonable royalties for the '437 patent under the Profit Apportionment Approach for Damages Scenario 2.

³²⁷ Exhibit 3a.

- (2) SAP and Teradata participated as suppliers in the same overall industry, although they were not direct competitors related to the Teradata Accused Products (*Georgia-Pacific* Factor 5).
- May 2013 Hypothetical Negotiation for the '179 Patent
 - Profit Apportionment Approach³²⁸
 - My economic damages analysis based on the apportionment of the expected profits of the Teradata Accused Products to the claimed technologies of the '179 patent, as specifically addressed under *Georgia-Pacific* Factors 8 and 13, results in lump-sum reasonable royalties for the '179 patent of [REDACTED] for the damages period from July 10, 2013 through November 2021 and [REDACTED] for the damages period from May 21, 2019 through November 2021.³²⁹
 - The steps in my Profit Apportionment Approach address many of the considerations under the remaining *Georgia-Pacific* factors.
 - (1) The expected revenues for the Teradata Accused Products used in this approach account for the scope of the SAP-Teradata hypothetical license (*Georgia-Pacific* Factor 3) and the term of the SAP-Teradata hypothetical license (*Georgia-Pacific* Factor 7).
 - (2) The split of the apportioned incremental profits for the Teradata Accused Products between SAP and Teradata further apportions for Teradata's contributions to the accused products (*Georgia-Pacific* Factor 13).
 - (3) Furthermore, I have accounted for the incremental value of the '179 patented technology over not having this technology implemented in the Teradata Accused Products (*Georgia-Pacific* Factors 9, 10, and 11).
 - There are additional considerations under the *Georgia-Pacific* factors that would have an upward effect on the reasonable royalties for the '179 patent under the Profit Apportionment Approach, but I conservatively do not make any adjustments for these effects.
 - (1) SAP would be unwilling to grant a one-way license to the '179 patent to Teradata, a company that participated as a supplier in the same overall industry (*Georgia-Pacific* Factor 4).
 - (2) SAP and Teradata participated as suppliers in the same overall industry, although they were not direct competitors related to the Teradata Accused Products (*Georgia-Pacific* Factor 5).

³²⁸ See Exhibit 3b for my calculation of lump-sum reasonable royalties for the '179 patent under the Profit Apportionment Approach for Damages Scenario 2.

³²⁹ Exhibit 3a.



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Dated: March 29, 2021

Appendix A



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Dr. Gregory K. Leonard is a vice president in the Antitrust & Competition Economics Practice of CRA. He specializes in applied microeconomics and econometrics. He has provided testimony before US federal and state courts, government agencies, and arbitration panels on issues involving antitrust, damages estimation, statistics and econometrics, surveys, valuation, and labor market discrimination.

Dr. Leonard has written extensively in the areas of antitrust, industrial organization, econometrics, intellectual property, class certification, and labor economics. His publications have appeared in journals such as the *RAND Journal of Economics*, the *Journal of Industrial Economics*, the *Journal of Econometrics*, the *International Journal of Industrial Organization*, and the *Antitrust Law Journal*, among others. Dr. Leonard's writings were cited by the Court of Appeals for the Federal Circuit in its *Uniloc* decision. He is the Editorial Board Vice Chair for Economics of the *Antitrust Law Journal* and has served as a referee for numerous economic journals.

Dr. Leonard has given invited presentations on antitrust and intellectual property issues at the (US) Federal Trade Commission, the US Department of Justice, the former Anti-Monopoly Bureau of China's Ministry of Commerce, the Supreme People's Court of China, and Japan's Fair Trade Commission. He served as a consultant on the issue of immunities and exemptions to the (US) Antitrust Modernization Commission.

Papers and publications

"A Proposed Method for Measuring Competition Among Imperfect Substitutes." With J. Hausman and D. Zona. *Antitrust Law Journal* 60, 1992, pp. 889-900.

"Issues in the Contingent Valuation of Environmental Goods: Methodologies for Data Collection and Analysis." With D. McFadden. In *Contingent Valuation: A Critical Assessment*, ed. by J. A. Hausman, North Holland Press, 1993.

"Assessing Use Value Losses Due to Natural Resource Injury." With J. Hausman and D. McFadden. In *Contingent Valuation: A Critical Assessment*, ed. by J. A. Hausman, North Holland Press, 1993.

"Does Contingent Valuation Measure Preferences? Experimental Evidence." With P. Diamond, J. Hausman, and M. Denning. In *Contingent Valuation: A Critical Assessment*, ed. by J. A. Hausman, North Holland Press, 1993.

“Competitive Analysis with Differentiated Products.” With J. Hausman and D. Zona. *Annales d'Economie et de Statistique* 34, 1994, pp. 159-180.

“A Utility Consistent, Combined Discrete Choice and Count Data Model: Assessing Recreational Use Losses Due to Natural Resource Damage.” With J. Hausman and D. McFadden. *Journal of Public Economics* 56, 1995, pp. 1-30.

“Market Definition Under Price Discrimination.” With J. Hausman and C. Vellturo. *Antitrust Law Journal* 64, 1996, pp. 367-386.

“Achieving Competition: Antitrust Policy and Consumer Welfare.” With J. Hausman. *World Economic Affairs* 1, 1997, pp. 34-38.

“Economic Analysis of Differentiated Products Mergers Using Real World Data.” With J. Hausman. *George Mason Law Review* 5, 1997, pp. 321-346.

“Superstars in the NBA: Economic Value and Policy.” With J. Hausman. *Journal of Labor Economics* 15, 1997, pp. 586-624.

“Efficiencies From the Consumer Viewpoint.” With J. Hausman. *George Mason Law Review* 7, 1999, pp. 707-727.

“Documents Versus Econometrics in Staples.” With J. Hausman. Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1305691.

“The Competitive Effects of a New Product Introduction: A Case Study.” With J. Hausman. *Journal of Industrial Economics* 30, 2002, pp. 237-263.

“Does Bell Company Entry into Long-Distance Telecommunications Benefit Consumers?” With J. Hausman and J. G. Sidak. *Antitrust Law Journal* 70, 2002, pp. 463-484.

“On Nonexclusive Membership in Competing Joint Ventures.” With J. Hausman and J. Tirole. *RAND Journal of Economics* 34, 2003.

“Correcting the Bias When Damage Periods are Chosen to Coincide With Price Declines.” With D. Carlton. *Columbia Business Law Review*, 2004, pp. 304-306.

“Competitive Analysis Using a Flexible Demand Specification.” With J. Hausman. *Journal of Competition Law and Economics* 1, 2005, pp. 279-301.

“Using Merger Simulation Models: Testing the Underlying Assumptions.” With J. Hausman. *International Journal of Industrial Organization* 23, 2005, pp. 693-698.

“Application of Empirical Methods in Merger Analysis.” With C. Dippon and L. Wu. Report to the Fair Trade Commission of Japan, June 27, 2005.

“A Practical Guide to Damages.” With L. Stiroh. In *Economic Approaches to Intellectual Property, Policy, Litigation and Management*, ed. by G. Leonard and L. Stiroh, 2005.

“Applying Merger Simulation Techniques to Estimate Lost Profits Damages in Intellectual Property Litigation.” In *Economic Approaches to Intellectual Property, Policy, Litigation and Management*, ed. by G. Leonard and L. Stiroh, 2005.

“Antitrust Implications of Pharmaceutical Patent Litigation Settlements.” With R. Mortimer. In *Economic Approaches to Intellectual Property, Policy, Litigation and Management*, ed. by G. Leonard and L. Stiroh, 2005.

“Framework for Policymakers to Analyze Proposed and Existing Antitrust Immunities and Exemptions.” With D. Bush and S. Ross. Report to the Antitrust Modernization Commission, October 24, 2005.

“Real Options and Patent Damages: The Legal Treatment of Non-Infringing Alternatives and Incentives to Innovate.” With J. Hausman. *Journal of Economic Surveys* 20, 2006, pp. 493-512 (reprinted in *Economic and Legal Issues in Intellectual Property*, M. McAleer and L. Oxley, eds., Blackwell Publishing, 2007).

“The Competitive Effects of Bundled Discounts.” In *Economics of Antitrust: Complex Issues in a Dynamic Economy*, ed. by L. Wu, 2007.

“Estimation of Patent Licensing Value Using a Flexible Demand Specification.” With J. Hausman. *Journal of Econometrics* 139, 2007, pp. 242-258.

“Patent Damages and Real Options: How Judicial Characterization of Non-Infringing Alternatives Reduces Incentives to Innovate.” With J. Hausman and J. G. Sidak. *Berkeley Technology Law Journal* 22, Spring 2007, pp. 825-853.

“Don’t Feed the Trolls.” With N. Attenborough and F. Jimenez. *les Nouvelles*, Vol. 42, September 2007, pp. 487-495 (reprinted in *Patent Trolls: Legal Implications*, C.S. Krishna, ed., The Icfai University Press, 2008). With J. Johnson, C. Meyer, and K. Serwin. “Are Three to Two Mergers in Markets with Entry Barriers Necessarily Problematic?” *European Competition Law Review* 28, October 2007, pp. 539-552.

“Economics and the Rigorous Analysis of Class Certification in Antitrust Cases.” With L. Wu. *Journal of Competition Law and Economics* 3, 2007, pp. 341-356. With J. Johnson. “Assessing the Competitive Effects of a Merger: Empirical Analysis of Price Differences Across Markets and Natural Experiments.” *Antitrust*, Fall 2007, pp. 96-101.

“Incentives and China’s New Antimonopoly Law.” With F. Deng. *Antitrust*, Spring 2008, pp. 73-77.

“Use of Simulation in Competitive Analysis.” With J.D. Zona. In *Issues in Competition Law and Policy*, ed. by W. Dale Collins, 2008.

“Allocative and Productive Efficiency.” With F. Deng. In *Issues in Competition Law and Policy*, ed. by W. Dale Collins, 2008.

“In the Eye of the Beholder: Price Structure as Junk Science in Antitrust Class Certification Proceedings.” With J. Johnson. *Antitrust*, Summer 2008, pp. 108-112.

“Merger Retrospective Studies: A Review.” With G. Hunter and G. S. Olley. *Antitrust*, Fall 2008, pp. 34-41.

“Roundtable Discussion: Developments—and Divergence—in Merger Enforcement.” *Antitrust*, Fall 2008, pp. 9-27.

“Dispatch From China.” *Antitrust*, Spring 2009, pp. 88-89.

“A Hard Landing in the Soft Drink Market – MOFCOM’s Veto of the Coca-Cola/Huiyuan Deal.” With F. Deng and A. Emch. *Antitrust Chronicle*, April 2009(2).

“Predatory Pricing after *linkline* and *Wanadoo*.” With A. Emch. *Antitrust Chronicle*, May 2009(2).

“Farrell and Shapiro: The Sequel.” With M. Lopez. *Antitrust*, Summer 2009, pp. 14-18.

“掠夺性定价—美国与欧盟的法律及经济学分析” (“Predatory Pricing – Economics and Law in the United States and the European Union”), 法学家 (*Jurists’ Review*), 2009, pp. 100-110. With A. Emch.

“Revising the Merger Guidelines: Second Request Screens and the Agencies’ Empirical Approach to Competitive Effects.” With L. Wu. *Antitrust Chronicle*, December 2009(1).

“How Private Antitrust Litigation May Be Conducted in China.” With F. Deng and W. Tang. *Competition Law* 360, January 6, 2010.

“Merger Screens: Market-Share Based Approaches and ‘Upward Pricing Pressure,’” *Antitrust Source*, February 2010. With E. Bailey, G. S. Olley, and L. Wu.

“Minimum Resale Price Maintenance: Some Empirical Evidence From Maryland.” With E. Bailey. *BE Journal of Economic Analysis & Policy* 10, 2010.

“Three Cases Reshaping Patent Licensing Practice.” With E. Bailey and A. Cox. *Managing Intellectual Property*, March 2010.

“Econometrics and Regression Analysis.” With J. Langenfeld, W. Li, and J. Morris. in *Proving Antitrust Damages: Legal and Economic Issues*, ABA Section of Antitrust (2nd Edition), 2010.

“Patent Damages: What Reforms Are Still Needed?.” With M. Lopez. *Landslide* 2, May/June 2010.

“The Google Books Settlement: Copyright, Rule 23, and DOJ Section 2 Enforcement.” *Antitrust*, Summer 2010, pp. 26-31.

“The 2010 Merger Guidelines: Do We Need Them? Are They All We Need?.” *Antitrust Chronicle*, October 2010(2).

“Evaluating the Unilateral Competitive Effects of Mergers Among Firms with High Profit Margins.” With E. Bailey and L. Wu. *Antitrust*, Fall 2010, pp. 28-32.

“Predatory Pricing in China—In Line With International Practice?.” With A. Emch. *Legal Issues of Economic Integration* 37, 2010, pp. 305-316.

“What Can Be Learned About the Competitive Effects of Mergers From ‘Natural Experiments’?.” With G. S. Olley. *International Journal of the Economics of Business* 18, 2011, pp. 103-107.

“District Court Rejects the Google Books Settlement: A Missed Opportunity?.” *Antitrust Source*, April 2011.

“Making Sense of ‘Apportionment’ in Patent Damages.” With E. Bailey and M. Lopez. *Columbia Science and Technology Law Review* 12, pp. 255-271, 2011.

“Rigorous Analysis of Class Certification Comes of Age.” With J. Johnson. *Antitrust Law Journal* 77, 2011, pp. 569-586.

“Economic Analysis in Indirect Purchaser Class Actions.” With F. Deng and J. Johnson. *Antitrust*, Fall 2011, pp. 51-57.

“Merger Assessment and Frontier of Economic Analyses (4): Empirical Methods in Antitrust Merger Review.” With L. Wu. *Kokusai Shoji Houmu (International Business Law and Practice)*, Vol. 40, No. 3, 2012, pp. 391-401.

“Merger Assessment and Frontier of Economic Analyses (5): Empirical Methods in Antitrust Merger Review.” With L. Wu. *Kokusai Shoji Houmu (International Business Law and Practice)*, Vol. 40, No. 4, 2012, pp. 557-564.

“Merger Assessment and Frontier of Economic Analyses (6): Empirical Methods in Antitrust Merger Review.” With L. Wu. *Kokusai Shoji Houmu (International Business Law and Practice)*, Vol. 40, No. 5, 2012, pp. 731-739.

“Economists’ Roundtable on Hot Patent-Related Antitrust Issues.” With D. Carlton, C. Meyer, C. Shapiro. *Antitrust*, Summer 2013, pp. 10-21.

“Not So Natural Experiments.” *Competition Policy International*, July 2013 (2).

“The Role of China’s Unique Economic Characteristics in Antitrust Enforcement.” With F. Deng. In *China’s Anti-Monopoly Law: The First Five Years*, ed. by Adrian Emch and David Stallibrass, 2013.

“Reflections on Bazaarvoice.” With P. Normann. *CPI Antitrust Chronicle*, March 2014 (1).

"An Introduction to Econometric Analysis." In *Econometrics: Legal, Practical and Technical Issues*, ABA Section of Antitrust (2nd Edition), 2014.

"The Econometric Framework." in *Econometrics: Legal, Practical and Technical Issues*, ABA Section of Antitrust (2nd Edition), 2014.

"Applying Econometrics to Estimate Damages." With J. Langenfeld, W. Li, and J. Morris. in *Econometrics: Legal, Practical and Technical Issues*, ABA Section of Antitrust (2nd Edition), 2014.

"Determining RAND Royalties for Standard-Essential Patents." With M. Lopez. *Antitrust*, Fall 2014, pp. 86-94.

"Reflections on the Debates Surrounding Standard-Essential Patents." *The Antitrust Source*, August 2015.

"Turning Daubert on Its Head: Efforts to Banish Hypothesis Testing in Antitrust Class Actions." *Antitrust*, Spring 2016, pp. 53-59.

"Roundtable with Economists: Discussing Practice and Theory with the Experts." With D. Carlton, P. Johnson, M. Maher, and C. Shapiro. *Antitrust*, Spring 2018, pp. 11-23.

"Comparative Analysis of Court-Determined FRAND Royalty Rates." With F. Deng and M. Lopez. *Antitrust*, Summer 2018, pp. 47-51.

"A Comparison of the Almost Ideal Demand System and Random Coefficients Logit Models For Use with Retail Scanner Data." With F. Deng. Working Paper, 2007.

Presentations

"Merger Analysis with Differentiated Products," paper presented to the Economic Analysis Group of the US Department of Justice, April 1991 (with J. Hausman and D. Zona).

"Assessing Use Value Losses Due to Natural Resource Injury," paper presented at "Contingent Valuation: A Critical Assessment," Cambridge Economics Symposium, April 3, 1992 (with J. Hausman and D. McFadden).

"Contingent Valuation and the Value of Marketed Commodities," paper submitted to the Contingent Valuation Panel of the National Oceanic and Atmospheric Administration, U.S. Department of Commerce, August 12, 1992 (with J. Hausman).

"Economic Analysis of Differentiated Products Mergers Using Real World Data," paper presented to the George Mason University Law Review Antitrust Symposium, October 11, 1996 (with J. Hausman).

"Documents Versus Econometrics in Staples," paper presented to a program of the Economics Committee of the ABA Antitrust Section, September 5, 1997 (with J. Hausman).

Discussant, "New Developments in Antitrust" session, AEA meetings, January 7, 2000.

"In Defense of Merger Simulation," Department of Justice and Federal Trade Commission Merger Workshop, Unilateral Effects Session, February 18, 2004.

Discussant, "Proving Damages in Difficult Cases: Mock Trial & Discussion," NERA Antitrust & Trade Regulation Seminar, July 10, 2004.

"Network Effects, First Mover Advantage, and Merger Simulation in Damages Estimation," LSI Workshop on Calculating and Proving Patent Damages, July 16, 2004.

"Early Exchange of Documents," LSI Workshop on Pre- and Early Stage Patent Litigation, July 23, 2004.

"Lessons Learned From Problems With Expert Testimony: Antitrust Suits," LSI Workshop on Effective Financial Expert Testimony, November 4, 2004.

"Price Erosion and Convoyed Sales," LSI Workshop on Calculating & Proving Patent Damages, January 19, 2005.

"Economic Analysis of Rule 23(b)(3)," LSI Litigating Class Action Suits Conference, June 6, 2005.

"Early Exchange of Documents," LSI Workshop on Pre- & Early-Stage Patent Litigation, July 22, 2005.

"Issues to Consider in a Lost Profits Damages Analysis," Patent Litigation 2005, Practising Law Institute, September 30, 2005.

"Antitrust Issues in Standard Setting and Patent Pools," Advanced Software Law and Practice Conference, November 3, 2005.

"New Technologies for Calculating Lost Profits," LSI Workshop on Calculating & Proving Patent Damages, February 27, 2006.

"Estimating Antitrust Damages," Fair Trade Commission of Japan, April 21, 2006.

"Economic Analysis of Rule 23(b)(3)," LSI Litigating Class Action Suits Conference, May 11, 2006.

"Permanent Injunction or Damages: What is the Right Remedy for Non-Producing Entities?," San Francisco Intellectual Property Law Association/Los Angeles Intellectual Property Law Association Spring Seminar, May 20, 2006.

"Antitrust Enforcement in the United States" and "Economic Analysis of Mergers," Sino-American Symposium on the Legislation and Practice of Anti-Trust Law, Beijing Bar Association, Beijing, People's Republic of China, July 17, 2006.

“Economic Analysis in Antitrust,” Chinese Academy of Social Sciences, Beijing, People’s Republic of China, July 20, 2006.

“Issues to Consider in a Lost Profits Damages Analysis,” Patent Litigation 2006, Practicing Law Institute, September 26, 2006.

“Comparison of the Almost Ideal Demand System and Random Coefficient Models for Use With Retail Scanner Data,” Pacific Rim Conference, Western Economic Association, Beijing, People’s Republic of China, January 12, 2007 (with F. Deng).

Discussant, “Applied Economics” Session, Pacific Rim Conference, Western Economic Association, Beijing, People’s Republic of China, January 12, 2007.

“Balancing IPR Protection and Economic Growth in China,” International Conference on Globalization and the Protection of Intellectual Property Rights, Chinese University of Political Science and Law, Beijing, People’s Republic of China, January 20, 2007.

“The Use and Abuse of Daubert Motions on Damages Experts: Lessons from Recent Cases,” LSI Workshop on Calculating & Proving Patent Damages, February 27, 2007.

“Will Your Licenses Ever be the Same? Biotechnology IP Strategies,” BayBio 2007 Conference, April 26, 2007.

“Tension Between Antitrust Law and IP Rights,” Seminar on WTO Rules and China’s Antimonopoly Legislation, Beijing, People’s Republic of China, September 1, 2007.

“Issues to Consider in a Lost Profits Damages Analysis,” Patent Litigation 2007, Practicing Law Institute, September 25, 2007.

Discussant, “Dominance and Abuse of Monopoly Power” Session, China’s Competition Policy and Anti-Monopoly Law, J. Mirrlees Institute of Economic Policy Research, Beijing University, and the Research Center for Regulation and Competition, Chinese Academy of Social Sciences, Beijing, People’s Republic of China, October 14, 2007.

“Opening Remarks,” Seminar on China’s Anti-monopoly Law and Regulation on Abuse of Intellectual Property Rights, Beijing, People’s Republic of China, April 26, 2008.

“Issues to Consider in a Reasonable Royalty Damages Analysis,” Patent Litigation 2008, Practicing Law Institute, October 7, 2008.

“Econometric Evaluation of Competition in Local Retail Markets,” Federal Trade Commission and National Association of Attorneys General Retail Mergers Workshop, December 2, 2008,

“Merger Review Best Practices: Competitive Effects Analysis,” International Seminar on Anti-Monopoly Law: Procedure and Substantive Assessment in Merger Control, Beijing, People’s Republic of China, December 15-17, 2008.

“The Use of Natural Experiments in Antitrust,” Renmin University, Beijing, People’s Republic of China, December 18, 2008.

“China’s Antimonopoly Law: An Economist’s Perspective,” Bloomberg Anti-Monopoly Law of China Seminar, January 29, 2009.

Panelist, “Standards for Assessing Patent Damages and Their Implementation by Courts,” FTC Hearings on the Evolving IP Marketplace, February 11, 2009.

“Economic Analysis of Agreements Between Competitors” and “Case Study: FTC Investigates Staples’ Proposed Acquisition of Office Depot,” Presentation to Delegation of Antitrust Officials from the People’s Republic of China, Washington, DC, March 23, 2009.

“Reasonable Royalties in the Presence of Standards and Patent Pools,” LSI Workshop, April 20, 2009.

Presentations on Unilateral Effects, Buyer Power, and the Intellectual Property-Antitrust Interface to Delegation from the Anti-Monopoly Bureau of MOFCOM of the People’s Republic of China, Washington, DC, May 10-11, 2009.

Panelist, “The Use of Economic and Statistical Models in Civil and Criminal Litigation,” Federal Bar Association, San Francisco, May 13, 2009.

“Trends in IP Rights Litigation and Economic Damages in China,” Pursuing IP in the Pacific Rim, May 14, 2009.

Presentation on the Economics of Antitrust, National Judicial College of the People’s Republic of China, Xi’an, People’s Republic of China, May 25-26, 2009.

“Case Study: The Use of Economic Analysis in Merger Review,” Presentation to the Anti-Monopoly Bureau of MOFCOM, Beijing, People’s Republic of China, May 27, 2009.

“Economics and Antitrust Law,” China University of Political Science and Law, Beijing, People’s Republic of China, September 21, 2009.

“Case Study: Economic Analysis of Coordinated Interaction,” Presentation to the Anti-Monopoly Bureau of MOFCOM, Beijing, People’s Republic of China, September 22, 2009.

“Relevant Market Definition,” 4th Duxes Antitrust Law Seminar, Beijing, People’s Republic of China, September 26, 2009.

“Expert Economic Testimony in Antitrust Litigation,” Supreme People’s Court, Beijing, People’s Republic of China, February 2, 2010.

“New Case Law for Patent Damages,” Law Seminars International Telebriefing, April 28, 2010.

“China/India: Sailing in Uncharted Waters: Regulating Competition in the Emerging Economies – New Laws, New Enforcement Regimes and No Precedents,” The Chicago Forum on International Antitrust Issues, Northwestern University School of Law Searle Center, May 20, 2010.

“Antitrust and Intellectual Property,” Supreme People’s Court, Beijing, People’s Republic of China, May 26, 2010.

“Cartel Enforcement Trends in the United States,” 2nd Ethical Beacon Anti-Monopoly Summit, Beijing, People’s Republic of China, May 27, 2010.

Panelist, “The Future of Books and Digital Publishing: the Google Book Settlement and Beyond,” 2010 American Bar Association Annual Meeting, August 7, 2010.

“Coordinated Effects” and “Non-Horizontal Mergers,” Presentations to Delegation from India Competition Commission, US Chamber of Commerce, Washington, DC, October 26, 2010.

“UPP and Merger Simulation,” Annual Conference of the Association of Competition Economics, Norwich, UK, November 11, 2010.

“Uniloc v. Microsoft: A Key Ruling For Patent Damages,” Law Seminars International Telebriefing, January 21, 2011.

“Correlation, Regression, and Common Proof of Impact,” New York City Bar Association, January 19, 2011.

“Private Litigation Under China’s New Antimonopoly Law,” Bar Association of San Francisco, February 17, 2011.

“Competition Law and State Regulation: Setting the Stage and Focus on State-Owned Enterprises,” Competition Law and the State: International and Comparative Perspectives, Hong Kong, People’s Republic of China, March 18, 2011.

Panelist, “Booking it in Cyberspace: The Google Book Settlement and the Aftermath,” American Intellectual Property Law Association, San Francisco, May 13, 2011.

“Econometric Estimation of Cartel Overcharges,” ZEW Conference on Economic Methods and Tools in Competition Law Enforcement, Mannheim, Germany, June 25, 2011.

Panelist, “Antitrust and IP in China,” Antitrust and IP in Silicon Valley and Beyond, American Bar Association and Stanford University, Palo Alto, October 6, 2011.

Panelist, University of San Diego School of Law Patent Law Conference: The Future of Patent Law Remedies, January 18, 2013.

“Economics Framework,” US-China Workshop on Competition Law and Policy for Internet Activities, China’s State Administration for Industry and Commerce (SAIC) and the U.S. Trade and Development Agency (USTDA), Shenzhen, People’s Republic of China, June 4-5, 2013.

Panelist, "China Inside and Out," American Bar Association, Beijing, People's Republic of China, September 16-17, 2013.

Panelist, "Remedies in Patent Cases," Fifth Annual Conference on The Role of the Courts in Patent Law & Policy, Berkeley and Georgetown Law Schools, November 1, 2013.

"Royalty Base," Leadership Conference, Qualcomm Incorporated, March 21, 2014.

"Reflections on Natural Experiments," DG Comp, April 8, 2014.

Panelist, "Antitrust in Asia: China," American Bar Association Section of Antitrust Law, Beijing, People's Republic of China, May 21-23, 2014.

Panelist, "Patent Damages Roundtable," 2015 Intellectual Property Institute, University of Southern California Gould School of Law, Los Angeles, March 23, 2015.

Panelist, "IP and Antitrust – The Current State of Economic Analysis," Global Competition Review Live 2nd Annual IP & Antitrust USA, Washington, DC, April 14, 2015.

Panelist, "FRAND Royalty Rates After Ericsson v. D-Link," American Bar Association, May 15, 2015.

Participant, Patent Damages Workshop, University of California-Berkeley, March 3, 2016.

Panelist, "FRANDtopia – In a Perfect World," LAIPLA Spring Conference, May 5, 2018.

Panelist, "Chicago Forum on International Antitrust Issues," Northwestern Pritzker School of Law, June 15, 2018.

Panelist, "Competition in Digital Advertising: Is There Online and Offline Convergence?," Challenges to Antitrust in a Changing Economy, Harvard Law School, November 8, 2019.

Testimonies given in the last four years

In the Matter of: Determination of Rates and Terms for Making and Distributing Phonorecords (Phonorecords III), before the United States Copyright Royalty Board Library of Congress, Docket No. 16-CRB-0003-PR (2018-2022), 2017 (Deposition, Hearing Testimony).

Intel Corporation v. Future Link Systems, LLC, United States District Court for the District of Delaware, Civil Action No.: 14-377-LPS, 2017 (Deposition).

Joel Simkhai, et al. v. KL Grindr Holdings Inc. et al., American Arbitration Association, Case No. 01-16-0003-7637, 2017 (Deposition).

In Re Capacitors Antitrust Litigation (Indirect), United States District Court for the District of Northern California, San Francisco Division, Case No. 3:14-CV-03264, 2017 (Deposition).

Evolved Wireless, LLC v. HTC Corporation and HTC America, Inc., United States District Court for the District of Delaware, Civil Action No. 15-543-SLR-SLF, 2017 (Deposition).

In Re Solodyn (Minocycline Hydrochloride) Antitrust Litigation, United States District Court for the District of Massachusetts, Case No. 1:14-md-02503, 2017 (Deposition).

Boston Scientific Corporation and Boston Scientific Scimed, Inc. v. Edwards Lifesciences Corporation; Edwards Lifesciences Corporation, Edwards Lifesciences PVT, Inc. and Edwards Lifesciences LLC v. Boston Scientific Corporation, Boston Scientific Scimed, Inc., and Sadra Medical, Inc., United States District Court for the District of Delaware, Case No. 16-CV-275 (SLR), 2017 (Deposition), 2018 (Trial Testimony).

Depomed, Inc. v. Purdue Pharma L.P., The P.F. Laboratories, Inc., and Purdue Pharmaceuticals L.P., United States District Court for the District of New Jersey, Civil Action No. 3:13-00571 (BRM/TJB), 2018 (Deposition).

Rembrandt Diagnostics, LP, v. Innovacon, Inc., United States District Court for the Southern District of California, Case No. 16-CV-00698 CAB (NLS), 2018 (Deposition).

Janssen Biotech, Inc. v. Celltrion Healthcare Co., Ltd., Celltrion, Inc., and Hospira, Inc., United States District Court for the District of Massachusetts, Civil Action No. 1:17-CV-11008, 2018 (Deposition).

SPEX Technologies, Inc. v. Apricorn, United States District Court for the Central District of California Southern Division, Case No. 2:16-CV-07349-JVS-AGR, 2018 (Deposition).

Huawei Technologies, Co., Ltd. et al. v. Samsung Electronics Co. Ltd., et al., United States District Court for the Northern District of California, San Francisco Division, Case No. 16-CV-02787-WHO, 2018 (Deposition).

Asustek Computer Incorporated, et al. v. InterDigital, Inc., et al., United States District Court for the Northern District of California, San Jose Division, Case No. 15-CV-1716 BLF, 2018 (Deposition).

Amgen Inc. v. Coherus Biosciences Inc., Superior Court of the State of California, County of Ventura, Case No. 56-2017-00493553-CU-VT-VTA, 2018 (Deposition).

Plexxikon Inc. v. Novartis Pharmaceuticals Corporation, United States District Court for the Northern District of California, Case No. 4:17-CV-04405-HSG (EDL), 2019 (Deposition).

Press Ganey Associates, Inc. v. Qualtrics, LLC, American Arbitration Association, Case No. 01-18-0004-4674, 2019 (Deposition).

In the Matter of: Determination of Rates and Terms for Digital Performance of Sound Recordings and Making of Ephemeral Copies to Facilitate those Performances (Web V), before the United States Copyright Royalty Board Library of Congress, Docket No. 19-CRB-0005-WR (2021-2025), 2020 (Deposition, Trial Testimony).

Abiomed Inc. v. Maquet Cardiovascular LLC, United States District Court for the District of Massachusetts, Case No. 1:16-cv-10914-FDS, 2020 (Deposition).

Network-1 Technologies, Inc. v. Google LLC, United States District Court for the Southern District of New York, Case No. 1:14-cv-09558, 2020 (Deposition).

3Shape A/S v. Align Technology, Inc., United States District Court for the District of Delaware, Civil Action No. 18-886-LPS-CJB, 2020 (Deposition).

Professional activities

Member, American Economic Association

Member, Econometric Society

Member, American Bar Association

Contributor, www.antitrust.org

Contributor, ABA Section of Antitrust Law, *Econometrics*, 2005

Associate Editor, *Antitrust*, 2007-2010

Senior Editor, *Antitrust Law Journal*, 2012-; Associate Editor, 2010-2012

Co-Editor, ABA Section of Antitrust Law Economics Committee Newsletter, 2009-2012

Member, Economics Task Force, ABA Section of Antitrust Law, 2011-2012

Member, ABA Delegation to International Seminar on Anti-Monopoly Law: Procedure and Substantive Assessment in Merger Control, Beijing, People's Republic of China, December 15-17, 2008.

Member, Working Group for drafting the "Joint Comments of the American Bar Association Section of Antitrust Law and Section of International Law on the MOFCOM Draft Guidelines for Definition of Relevant Markets," 2009.

Member, Working Group for drafting the "Joint Comments of the American Bar Association Section of Antitrust Law and Section of International Law on the SAIC Draft Regulations on the Prohibition of Acts of Monopoly Agreements and of Abuse of Dominant Market Position," 2009.

Member, Working Group for drafting the "Joint Comments of the American Bar Association Section of Antitrust Law and Section of International Law on the SAIC Draft Regulations on the Prohibition of Acts of Monopoly Agreements and of Abuse of Dominant Market Position," 2010.

Referee: *Econometrica*, *Review of Economics and Statistics*, *International Journal of Industrial Organization*, *Review of Industrial Organization*, *Journal of Sports Economics*, *Journal of Environmental Economics and Management*, *Research in Law and Economics*, *Labour Economics*, *Eastern Economic Journal*, *Journal of Forensic Economics*, *Antitrust*, *Antitrust Law Journal*, *Journal of Competition Law and Economics*, *Advances in Econometrics*.

Professional history

12/2019–Present	<i>Vice President</i> , Charles River Associates
2012–2019	<i>Partner</i> , Edgeworth Economics
2008–2012	<i>Senior Vice President</i> , NERA Economic Consulting
2004–2008	<i>Vice President</i> , NERA Economic Consulting
2000–2004	<i>Senior Vice President</i> , Lexecon, Inc.
1991–2000	<i>Director</i> , Cambridge Economics, Inc.
1990–1991	<i>Senior Analyst</i> , NERA Economic Consulting
1989–1990	<i>Assistant Professor</i> , Columbia University
	<ul style="list-style-type: none">• Econometrics• Statistics• Labor Economics

Appendix B

Appendix B
Documents Relied Upon
Report and Exhibits

Bates Documents

SAP_02681642	SAP_02684433	SAP_02684444	SAP_02684484
SAP_02684508	SAP_02684532	SAP_02684558	SAP_02684582
SAP_02684613	SAP_02684614	SAP_02684624	SAP_02684638
SAP_02684660	SAP_02684682	SAP_02684740	SAP_02684746
SAP_02684751	SAP_02684778	SAP_03201345	SAP_04262818
SAP_04691633	SAP_14068642	SAP_36981833	SAP_43550459
SAP_43550525	SAP_43550578	SAP_43550583	SAP_47962609
SAP_47962610	SAP_47962612	SAP_47962615	SAP_47962622
SAP_63723577	SAP-00006740	SAP-00006742	SAP-00006744
SAP-MS_00000310	TD00048499	TD00453377	TD00500555
TD00546501	TD00558114	TD00588575	TD00629908
TD01806924	TD01894105	TD01894122	TD01894144
TD01894152	TD01894156	TD01894169	TD01894177
TD01894192	TD01894209	TD01894229	TD01894246
TD01896420	TD01896424	TD01896432	TD01896433
TD01896436	TD01896462	TD01896464	TD01896478
TD01921852	TD01923635	TD02175809	TD02218145
TD02483960	TD02574125	TD03206560	TD03206561
TD03206562	TD03206563	TD03206564	TD03206565
TD03206566	TD03206567	TD03206568	TD03206569
TD03206570	TD03206571	TD03206572	TD03532710
TD03637000	TD04145710	TD08180620	TD08584489
TD08585047	TD13385100	TD13482233	TD13482238
TD13482241	TD13482247	TD13484698	TD13484700
TD13484702			

Depositions

Deposition 30(b)(1) and Exhibits of Franz Faerber, January 21, 2021.
 Deposition 30(b)(1) and Exhibits of Kevin Prey, February 9, 2021.
 Deposition 30(b)(6) and Exhibits of Franz Faerber, January 21, 2021.
 Deposition 30(b)(6) and Exhibits of Grace Au, January 7, 2021.
 Deposition 30(b)(6) and Exhibits of Peter Wetzels, February 26, 2021.
 Deposition 30(b)(6) and Exhibits of Steven Weber, February 5, 2021.
 Deposition and Exhibits of Joseph Choi, October 15, 2020.
 Deposition and Exhibits of Wayne Boyle, February 25, 2021.

Expert Reports

Expert Report of Dr. David Maier In Support of SAP SE's Patent Infringement Claims, March 15, 2021.
 Expert Report of Ouri Wolfson, Ph.D., March 29, 2021.

Analyst Reports

"Teradata Corp: Waiting for the Second Half," Barclays, May 3, 2013.
 "Teradata Corp: It's a Second Half Story!," Credit Suisse, May 2, 2013.
 "Teradata Corporation: The Old Teradata Two-Step; Initiate With a Neutral," BTIG, April 17, 2017.
 "Teradata Corporation: Positive 1Q17 Guide," Deutsche Bank Markets Research, February 9, 2017.
 "Teradata Corp: Too Much Uncertainty," Barclays, April 27, 2017.

Annual Reports

Informatica Corporation Annual Report, December 31, 2008.
 SAP AG Form 20-F, December 31, 2007.
 SAP AG Form 20-F, December 31, 2013.
 SAP SE Form 20-F, December 31, 2014.
 SAP SE Form 20-F, December 31, 2017.
 SAP SE Form 20-F, December 31, 2019.
 Teradata Annual Report, December 31, 2013.
 Teradata Annual Report, December 31, 2014.
 Teradata Annual Report, December 31, 2017.

Articles

Ariel Rubinstein, "Perfect Equilibrium in a Bargaining Model," *Econometrica*, Vol. 50, No. 1 (1982).
 Edward F. Sherry and David J. Teece, "Royalties, evolving patent rights, and the value of innovation," *Research Policy*, Vol. 33 (2004).
 John R. Allison and Mark A. Lemley, "Empirical Evidence on the Validity of Litigated Patents," *American Intellectual Property Law Association (AIPLA) Quarterly Journal*, Vol. 26, (1998).
 John R. Allison, Mark A. Lemley and David L. Schwartz, "How Often Do Non-Practicing Entities Win Patent Suits?," *Berkeley Technology Law Journal*, Vol. 32 (2017).

Case Law

AVM Techs., LLC v. Intel Corp., 927 F. Supp. 2d 139 (2013).
 Ericsson, Inc. v. D-Link Sys., Inc., 773 F.3d 1201 (2014).
 Garretson v. Clark, 111 U.S. 120 (1884).
 Georgia-Pacific Corp. v. United States Plywood Corp., 318 F. Supp. 1116 (1970).
 LaserDynamics, Inc. v. Quanta Computer, Inc., 694 F.3d 51 (2012).
 Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301 (2009).
 ResQNet.com, Inc. v. Lansa, Inc., 594 F.3d, 869 (2010)

Case Documents

Counterclaim-Plaintiff SAP SE's Disclosures Pursuant to Patent L R. 3-1 and 3-2, August 19, 2019.
 Defendants' Amended Answer to the Second Amended Complaint; SAP SE's Counterclaims, July 10, 2019.
 Defendants' First Supplemental Responses and Objections to Plaintiffs' Seventh Set of Interrogatories (No. 51), October 29, 2020.
 Defendants' Second Supplemental Responses and Objections to Plaintiffs' Seventh Set of Interrogatories (No. 51), February 12, 2021.
 Letter from James R. Hancock to Joshua L. Fuchs, dated February 25, 2021.
 Letter from James R. Hancock to Joshua L. Fuchs, dated February 9, 2021.
 Letter from Joshua L. Fuchs to Mary Prendergast, dated April 8, 2020.
 Letter from Joshua L. Fuchs to Mary Prendergast, dated March 9, 2020.
 Plaintiff Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Responses to Defendants' Third Set of Requests for Admission (Nos. 269-841), February 12, 2021.
 Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Corrected Responses to Defendants' Fourth Set of Document Requests, November 25, 2019.
 Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Eighth Supplemental and Amended Responses to Defendants' Third Set of Interrogatories (Nos. 19, 21, 22, 23, 26, 27), February 12, 2021.
 Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Responses to Defendants' Fourth Set of Document Requests, November 25, 2019.
 Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Responses to Defendants' Seventh Set of Interrogatories (Nos. 50-53), February 11, 2021.
 Plaintiffs Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Sixth Supplemental and Amended Responses to Defendants' Fourth Set of Interrogatories (Nos. 30, 35-38, 40), February 12, 2021.
 SAP SE's Narrowed Set of Patent Claims, December 15, 2020.

SAP SE's Patent L.R. 3-8 Damages Contentions, December 20, 2019.

SAP SE's Supplement to Patent L.R. 3-8 Damages Contentions, October 12, 2020.

Second Amended Complaint for Trade Secret Misappropriation, Copyright Infringement, Violation of Sherman Act § 1, Violation of Clayton Act § 3, Violation of Sherman Act § 2, December 21, 2018.

Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Corrected Fifth Supplemental and Amended Responses to Defendants' Third Set of Interrogatories (Nos. 21, 26), October 30, 2020.

Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Fifth Amended and Supplemental Responses to Defendants' Third Set of Interrogatories (Nos. 21, 26), October 26, 2020.

Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Responses to Defendants' Fourth Set of Interrogatories (Nos. 29-41), April 6, 2020.

Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Second Supplemental Responses to Defendants' Third Set of Interrogatories, January 29, 2021.

Teradata Corporation, Teradata US, Inc., and Teradata Operations, Inc.'s Supplemental Responses to Defendants' Third Set of Interrogatories, April 24, 2020.

Teradata's Corrected Fourth Supplemental and Amended Responses to Defendants' Fourth Set of Interrogatories (Nos. 38, 39), October 30, 2020.

Teradata's Fourth Supplemental and Amended Responses to Defendants' Fourth Set of Interrogatories (Nos. 38, 39), October 26, 2020.

Teradata's Responses to Defendants' Third Set of Interrogatories (Nos. 19-28), December 3, 2019.

Others

Bloomberg Terminal, March 3, 2021.

Websites

"Information Statement of Teradata Corporation, SEC Filing Exhibit 99.1," US Security and Exchange Commission, July 2, 2007, <https://www.sec.gov/Archives/edgar/data/816761/000119312507148452/dex991.htm>.

"Our History," Teradata Corporation, <https://www.teradata.com/About-Us/Our-History>.

"Introducing Teradata IntelliCloud: Our Next Generation Managed Cloud," Teradata, <https://www.teradata.com/Blogs/Introducing-Teradata-IntelliCloud-Our-Next-Generation-Managed-Cloud>.

"Juxtacomm Technologies Inc.," CompanyListing.ca, March 28, 2021, http://www.companylisting.ca/JuxtaComm_Technologies_Inc/default.aspx.

"SAP Business ByDesign Features," SAP, <https://www.sap.com/products/business-bydesign/features.html?btp=195ae8c5-1dbf-4918-9849-96d6114ff962>.

"SAP Business ByDesign," SAP, <https://www.sap.com/products/business-bydesign.html?btp=195ae8c5-1dbf-4918-9849-96d6114ff962>.

"SAP Business Warehouse," SAP, https://help.sap.com/doc/saphelp_nw74/7.4.16/en-us/b2/e50138fede083de10000009b38f8cf/content.htm?no_cache=true.

"SAP Company Information," SAP, March 28, 2021, <https://www.sap.com/about/company.html>.

"SAP SQL Anywhere," SAP, <https://www.sap.com/products/sql-anywhere.html?btp=195ae8c5-1dbf-4918-9849-96d6114ff962>.

"Teradata Database: High-Performance Analytics for Today's Business," Teradata, <https://assets.teradata.com/resourceCenter/downloads/Datasheets/EB9660.pdf>.

"Teradata IntelliBase," Teradata, <https://www.teradata.com/Products/Hardware/IntelliBase>.

"Teradata IntelliBase™," Teradata, https://assets.teradata.com/resourceCenter/downloads/Datasheets/EB10243_IntelliBase_2.0_11.5.2018.pdf.

"Teradata IntelliFlex," Teradata, <https://www.teradata.com/Products/Hardware/IntelliFlex>.

"Teradata IntelliFlex™," Teradata, <https://assets.teradata.com/resourceCenter/downloads/Datasheets/EB10002.pdf>.

"Teradata Intelligent Memory," Teradata, <https://assets.teradata.com/resourceCenter/downloads/WhitePapers/EB7614.pdf.pdf>.

"Teradata Vantage on Teradata Cloud," Teradata, <https://www.teradata.com/Cloud/Teradata-Cloud>.

"US7421437B2 – Systems and method for data dictionary cache in a distributed system," Google Patents, March 27, 2021, <https://patents.google.com/patent/US7421437B2>.

"US7617179B2 – Systems and methodology for cost-based subquery optimization using a left-deep tree join enumeration algorithm," Google Patents, March 27, 2021, <https://patents.google.com/patent/US7617179B2>.

“US8214321B2 – Systems and methods for data reporting,” Google Patents, March 27, 2021,
<https://patents.google.com/patent/US8214321B2>.

“US9626421B2 – ETL-less zero-redundancy system and method for reporting OLTP data,” Google Patents, March 27, 2021,
<https://patents.google.com/patent/US9626421B2>.

“Vantage: How to Enjoy Hybrid Partitioning with Teradata Columnar,” Teradata,
<https://www.teradata.com/Blogs/How-to-Enjoy-Hybrid-Partitioning-with-Teradata-Columnar>.

“What is SAP HANA?,” SAP,
<https://www.sap.com/products/hana/what-is-sap-hana.html?btp=195ae8c5-1dbf-4918-9849-96d6114ff962#overview>.

Patents

U.S. Patent No. 7,421,437.

U.S. Patent No. 7,617,179.

U.S. Patent No. 8,214,321.

U.S. Patent No. 9,626,421.

Exhibits



Category	Percentage
1. Only men	100%
2. Only women	100%
3. Both men and women	100%
4. Neither men nor women	100%
5. Don't know	100%
6. Not applicable	100%
7. Not sure	100%
8. Not applicable	100%

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Exhibit 2b

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[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]					
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The diagram illustrates a sequence of 11 steps, organized into three horizontal sections. The steps are represented by horizontal bars of varying lengths, some with internal markings, and a series of vertical lines connecting them. The diagram is rendered in black and white, with a high-contrast, almost binary appearance.

- Top Section:** Contains 4 steps. The first step is a long bar with a small vertical line near the left end. The second step is a shorter bar. The third and fourth steps are longer bars with internal markings.
- Middle Section:** Contains 4 steps. The first step is a long bar with a small vertical line near the left end. The second step is a shorter bar. The third and fourth steps are longer bars with internal markings.
- Bottom Section:** Contains 3 steps. The first step is a long bar with a small vertical line near the left end. The second and third steps are shorter bars.

The vertical lines connecting the steps indicate a flow or sequence. The diagram is rendered in black and white, with a high-contrast, almost binary appearance.

Exhibit 4a

[REDACTED]
 [REDACTED]
 [REDACTED]
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The diagram consists of a 10x10 grid of cells. The grid is divided into four quadrants by a central vertical line. The top-left quadrant contains a large 'X' shape. The top-right quadrant contains a large 'Y' shape. The bottom-left quadrant contains a large 'Z' shape. The bottom-right quadrant contains a large 'W' shape. The grid is surrounded by a thick black border. The symbols are black on a white background.

[REDACTED]

Expert Report of Dr. Gregory K. Leonard
Case No. 3:18-cv-03670-WHO

A black and white photograph of a large, multi-story building with a complex facade, featuring many windows and a prominent central section. The building is surrounded by trees and greenery. The image is oriented vertically, with the building's facade running from top to bottom.

Expert Report of Dr. Gregory K. Leonard
Case No. 3:18-cv-03670-WHO

Expert Report of Dr. Gregory K. Leonard
Case No. 3:18-cv-03670-WHO

Expert Report of Dr. Gregory K. Leonard
Case No. 3:18-cv-03670-WHO

Actuals

Timeline of events from 1990 to 2000, categorized by Actuals, Predicted, and Unpredicted.

Legend:

- Actuals (Blue bars)
- Predicted (Red bars)
- Unpredicted (Green bars)

Key events and periods shown:

- 1990: Actuals, Predicted, Unpredicted
- 1991: Actuals, Predicted, Unpredicted
- 1992: Actuals, Predicted, Unpredicted
- 1993: Actuals, Predicted, Unpredicted
- 1994: Actuals, Predicted, Unpredicted
- 1995: Actuals, Predicted, Unpredicted
- 1996: Actuals, Predicted, Unpredicted
- 1997: Actuals, Predicted, Unpredicted
- 1998: Actuals, Predicted, Unpredicted
- 1999: Actuals, Predicted, Unpredicted
- 2000: Actuals, Predicted, Unpredicted

[illegible]

Actuals							Budget		Budget		Budget		Budget		Budget
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
				■	■	■	■	■	■	■	■	■	■	■	■
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						■	■	■	■	■	■	■	■	■	■
	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
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■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

(b) (7)(C), (b) (7)(D)

(b) (7)(C), (b) (7)(D)

Actuals

The figure displays a timeline of events from 1990 to 2010. The top section is a grid of black squares representing data points. The bottom section is a bar chart showing the duration of various events. The timeline is marked with years from 1990 to 2010. The grid shows a high density of events in the early 1990s, which then decreases over time. The bar chart shows the duration of these events, with many events lasting for several years.

[illegible]

Expert Report of Dr. Gregory K. Leonard
Case No. 3:18-cv-03670-WHO

The diagram consists of a series of horizontal black bars of varying lengths and positions, arranged in a hierarchical manner. At the top, a single bar is centered. Below it, a row of seven bars is shown, each centered under a column. These columns are further divided into sub-columns by smaller bars. The diagram represents a complex system of relationships or a data structure, possibly a tree or a network, with a high degree of symmetry and repetition.

Expert Report of Dr. Gregory K. Leonard
Case No. 3:18-cv-03670-WHO

Exhibit 7b

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Exhibit 8a

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EXHIBIT

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A black and white photograph of a large group of people, mostly men in military uniforms, standing in formation outdoors. They are arranged in several rows, with some individuals in the front row wearing berets. The background is a plain, light-colored wall.

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Exhibit 10b
Teradata License Agreements

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| <p> QUESTION
 What is the purpose of the study? </p> | | <p> ANSWER
 The purpose of the study is to determine the effect of the intervention on the outcome. </p> | | <p> REFERENCE
 (Cite the source of the information) </p> |
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| <p> QUESTION
 What is the purpose of the study? </p> | <p> ANSWER
 The purpose of the study is to determine the effect of the intervention on the outcome. </p> | <p> REFERENCE
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| <p> QUESTION
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